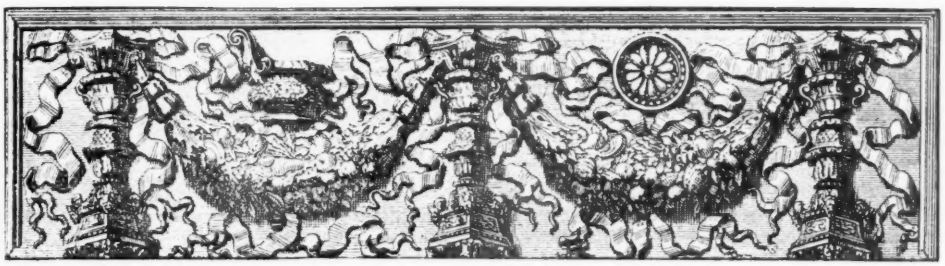


THE LATE JOHN LOUGHBOROUGH PEARSON, R.A.

TO the future and its judgment a true estimate of the work of a great artist and his influence upon his times must be left. Especially is this the case when he has lived in the days of Eclecticism; not less so, when the quality of his production has grown and gathered up in freshness, vigour, and grace to the very close of a life of fourscore years, and when the hand which has shown the way to so many has only just laid down the pencil. Only yesterday John Loughborough Pearson was working amongst us—one of us in very deed—even at his great age, and after his many and great achievements, as to his life's work, still young—cut off in the very vigour of his intellect and fulness of his power. Although it is now too soon to form a final estimate of him, we may well look back into the character of the man and his methods. That he was first a disciple and afterwards, in works not words, a leader in the so-called Gothic Revival—in so far at least that he was a builder of great Gothic churches—must be attributed to the mere chance of the time into which he was born; for an intimate knowledge of the man himself led to the firm conviction that to him style was but the clothing of great architectural ideas—that the indispensable scholarship and inexhaustible knowledge of tradition were the means only towards the expression of such ideas—that at the very height of the great, now almost historical, battle of the styles, he, wellnigh alone of his school, kept a balanced mind. It is a fact that a great classical or renascence work was, in his latter years, a—perhaps somewhat vaguely—cherished ambition of the creator of Truro Cathedral and St. Augustine's, Kilburn. Had such an opportunity offered, there can be no doubt that we should have had, from his remarkable sense for proportion and composition, from his intimate knowledge of detail, a building as full of refinement, character, and repose as the best of those in that mediæval manner which he made peculiarly his own.

It was, perhaps, from this view of architecture as a comprehensive art rather than an aggregation of divergent styles, of which one should take precedence of all, that his work is to be differentiated from that of his most eminent contemporaries of the Revival. Even at a time, now fortunately almost historical, when straying from pure imitation of the past was apt to be regarded as an architectural sin, or mark of ignorance, traces of an individuality are to be found in the compositions of his earliest period, which may be said to extend roughly from his first church at Elleker, in 1843, to the conception of St. Peter's, Vauxhall, in 1861, the first of his new vaulted structures. It was this new delight he seems to have found in the stone groined roof, in dealing with which he became the acknowledged master of his time, that developed his full powers and produced St. John's, Red Lion Square, and other well-known kindred structures, where we find not only a complete mastery over forms of mediæval art,

FIG. 1.—DALTON-HOLME CHURCH, YORKSHIRE (1858).
(From a water-colour drawing.)

but a sympathy with its nature and insight into its methods, all made subservient to modern needs, and, hardest of all, to the demands of modern economy. Of these works of striking individuality and merit, while they have not been surpassed—not often rivalled—in their expression of the highest mediæval ideals of architectural fitness, it is still to be said that they are essentially of the age and of the man, and as such they will take their place in the history of Art.

Born in Brussels in 1817, Mr. Pearson was articled at the early age of fourteen to Ignatius Bonomi, in Durham. His grandfather was a well-known lawyer of that city, while his father, William Pearson, was an etcher and water-colourist, who shows a distinct taste for the picturesque and romantic in architecture just at the period of the romantic movement in literature which characterised the early years of the century. In 1824 he published a series of etchings, *Picturesque Views*, and a little later a more important volume, *Antiquities of Salop*. His technical skill with the etcher's needle exhibits no great aptitude, but the subjects, which are almost exclusively architectural, are rendered with evident appreciation of form and contour, and no little taste in selection. Here no doubt was the germ of what was to make the son famous. But the young architect must have had in his early years an infinite capacity for painstaking study and application. The great Cathedral of Durham, culminating in its Nine Altars, was there to his hand, and every spare hour from office work was spent in and around its walls. His veneration for it never grew less throughout his long life, and it is not a little interesting to find him seeking the motive for the choir triforium of his own Cathedral of Truro at the

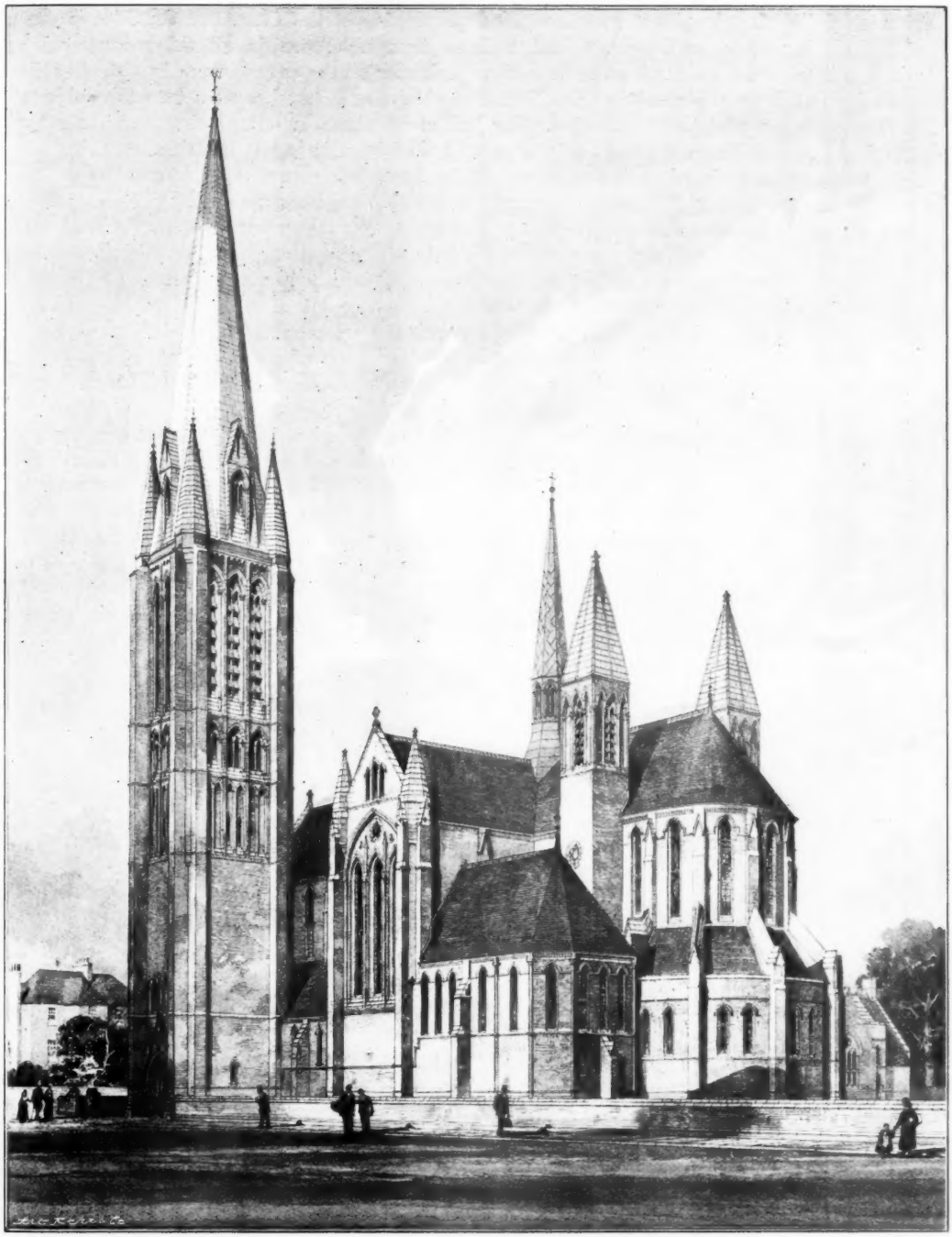


FIG. 2.—ST. MICHAEL'S, CROYDON: SOUTH-EAST VIEW (1880). (From a water-colour drawing.)

source of his first inspirations. The grand proportions of the Chapel of the Nine Altars strike all beholders, and, modest and reticent though he was in all things concerning himself, it was a treat sometimes to hear him speak with all the enthusiasm of youth over his early joy in this great structure. The Yorkshire abbeys and churches were also the subjects of his constant study and attention. He had at all times an extraordinary aptitude for gauging and absorbing the salient points for study and interest in any building.

In early days his education was amplified by numerous careful and accurate sketches, drawn with an excellent line, often vigorously washed in, and accompanied by full dimensions and sometimes by apt verbal descriptions. Those were the days when photographs were not, and books were comparatively scarce. But his industry seems to have been untiring, and he drew from every source, for wherever possible books and plates were also borrowed, and he was not content with the mere reading and study of these. Every plate of value was carefully copied, not a detail of interest escaped him. These drawings were mounted with his own sketches into large scrap-books, and exhibit a happily chosen series of designs and details of every possible description, things great and small, artistic and constructional, of all styles, English and foreign. Nothing in which an architect should be proficient is omitted from these admirable and comprehensive studies, and the source of Mr. Pearson's indefatigable personal attention and love for every detail of the furniture and equipment as well as of his buildings themselves is thus not far to seek. As an increasing practice brought the means, he formed the nucleus of a fine architectural library which continued always his hobby and his recreation, and with every volume of which he was intimate, and could turn in a moment to plate or page bearing upon any subject of immediate interest or conversation. This was noticeably the case in regard to the cathedrals and abbeys in whose history and development he was deeply versed, and for the stones of which he had all the love and feeling of the most pronounced antiquary.

A study of a process of self-education here outlined, from which devolved such eminent results and so fine a character, is interesting in these days of teaching, text-books, and examination tests, although it has little bearing upon the fact that a genuine feeling for architecture, backed by irrepressible diligence, will surely find its own way to the front. In Mr. Pearson's case that innate power of appreciation and sympathy already alluded to had undoubtedly given him a keener insight than most of his fellows into the more abstruse causes and effects and methods of construction in which lies that indescribable factor "quality" in architecture, quite apart from correctness of form or detail. In nothing is this more apparent than in his vaulting. The carefully studied plan of the ribs upon the cap, so primarily essential to a successful treatment, the best pitch of the diagonals and transverse ribs to give a well-proportioned rise as viewed from below, their relative section and importance, differing so much in different surroundings, the awkward opposition of optical lines their conjunction is ever ready to set up if proper corrections are not warily introduced, and, not the least important of many intricacies, the constructional value and treatment without crudeness of the horizontal beds of the springers—all the factors in successful vaulting—he had learned to control so readily that no space was too irregular or awkward to induce the least appearance of effort in the vault he threw across it. He had mastered equally that mysterious intricacy of parts which is the charm, and often the wonder, of the later canopy and decorative niche work, frequently so bald and hard in modern efforts at reproduction.

In his procedure the plan always received the first and fullest consideration. His plans present a great variety, always showing some characteristic treatment dependent upon the conditions imposed, as, for example, at Truro, where the whole conception has its origin in the happy incorporation of south aisle of the old parish church. His western porches are frequently ingenious, and the management of the choir and the sanctuary specially interesting. In his larger structures the morning chapel has an important place, and is treated so as to

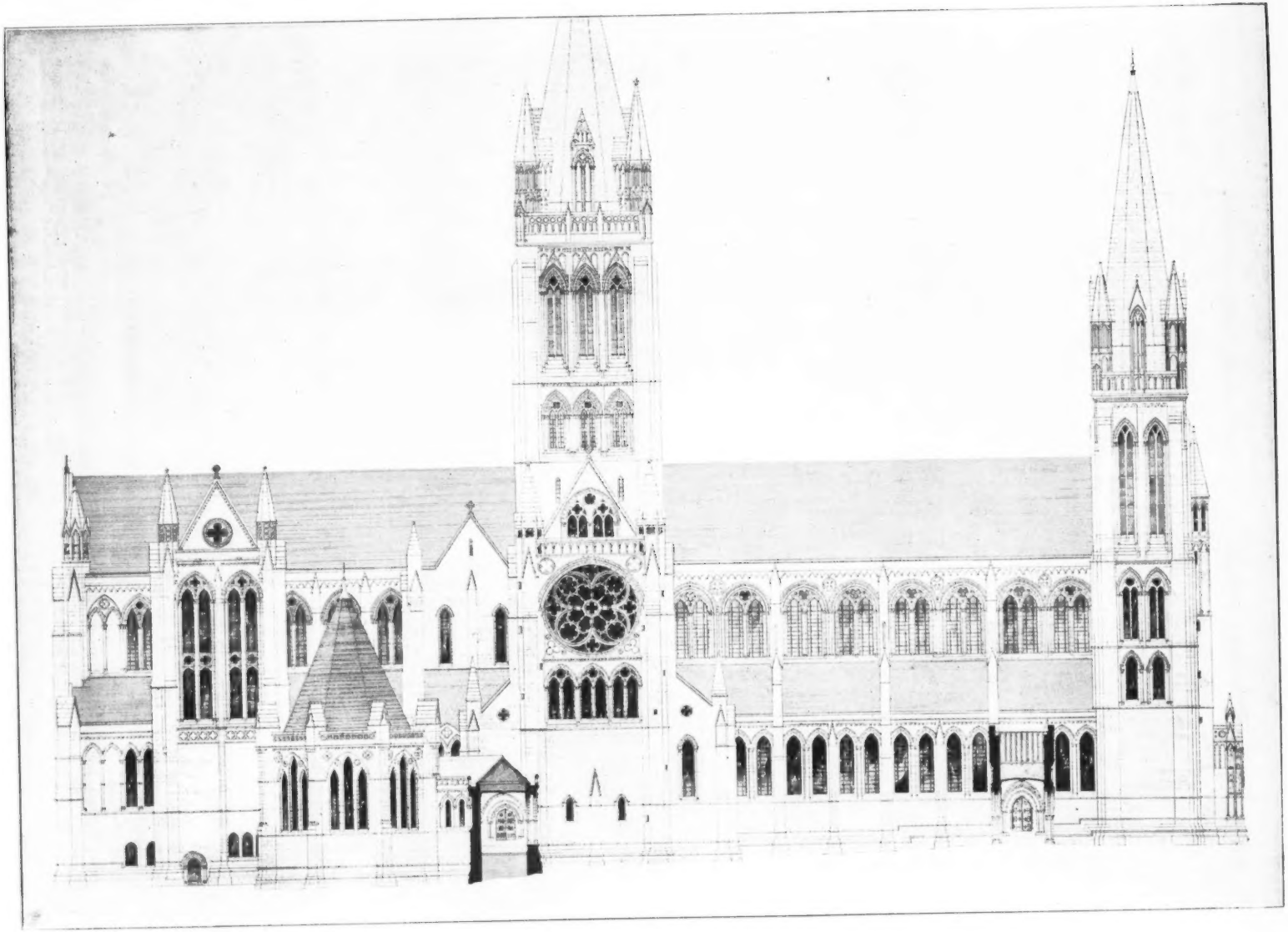


FIG. 3.—TRURO CATHEDRAL: NORTH ELEVATION.

give additional scale to the rest of the building. Notable instances are to be found at St. John's, Red Lion Square; St. Michael's, Croydon; and the Catholic Apostolic Church at Maida Vale. At Truro, on the other hand, the ornament is less restrained over the whole choir; but this will not have its proper value until the sterner nave is completed to create that effect of quiet contrast for which he invariably sought.

In general design he aimed first at form, covering both proportion and contour, and no matter how simple or how rich the detail of the design, these qualities of proportion and outline always held first place, and are to be found equally prominent in whole buildings, in their parts, and in their details. Whatever the coming changes of taste or developments of style, it is probable that his sense of beautiful proportion, of balance, and of harmony, will receive its

FIG. 1.—LECHLADE MANOR: ENTRANCE FRONT (1872-73).

due acknowledgment. To single out specific instances from so many notable examples, there may be mentioned the north transept of Truro [fig. 3], on a large scale, the Bishop's throne at Peterborough on a smaller one; while a blending of harmonious detail suitable to its position and circumstance is so marked in his work as frequently to identify its authorship.

As a great designer of towers, Mr. Pearson is perhaps not sufficiently known, and no reference to him and his work would be complete without some allusion to his special aptitude in this attractive field, due to his acute sense of vertical proportion and outline.

In the 1862 Exhibition, and afterwards at Paris, he showed a large sheet of tower designs, all, of course, in his earlier and less interesting manner, about half of which had been erected up to that date. The well-known tower and spire of Holy Trinity, Vauxhall Bridge (1848), is a typical example, and Dalton-Holme (1858) [fig. 1], one of the latest of this period. An interesting tower and spire, showing a great stride, was designed in 1862 for

FIG. 5.—WESTWOOD HOUSE: MUSIC ROOM (1880).

St. Peter's, Vauxhall, but never erected, which is to be regretted, as it would have made a fine contrast to the early example at the western end of the Bridge. Having thus loosened the reins, the tower designs which followed in great number are invariably vigorous and graceful, and many of them genuine masterpieces. It is unfortunate that the finest are only upon paper; but an illustration of St. Michael's, Croydon [fig. 2], is given to show the architect's conception of one of his completed churches in his best manner. And how nicely the whole is balanced! The scaffolding will soon be down from the lofty spire at Kilburn, which he never lived to see, as the vane was only placed upon it a week after his death. Widely divergent as these towers are in form, the same feeling runs through most of them. Buttresses are either slight or entirely dispensed with; strong vertical lines predominate; the stories are graded with an enviable intuition; the spire, when used, is generally short, and that frequent pitfall, the junction of tower and spire, always masterly. In this feature it may be noticed that Mr. Pearson often allowed Northern French methods to influence him as well as in that of entasis, which in both spires and turrets always had his closest care. As an illustration of his painstaking and self-critical methods the genesis of his own favourite amongst his towers—the central tower of Truro—is interesting. His first conception had been drawn in completely on the finished elevations, one of which is illustrated [fig. 3], when a night's brooding (or it may have been many) decided him that it could be bettered, that the whole must be erased to make room for another and a better, the best of all as it seemed to him. And if it ever comes to be erected with the same spirit as he would have put into it, it will be a worthy crown to a noble creation.

FIG. 6.—ST. AUGUSTINE'S, KILBURN (1871).

It has been well said that Mr. Pearson was better known to the public as a "restorer" than as a producer. Indifferent to architecture, the public is ready enough to take an interest in controversy, and too apt to side with the loudest shouters, irrespective of the merits of the question. It is not, therefore, surprising that one of the most learned, tender, and skilful of those whose lot it has been to preserve many of our most cherished monuments of antiquity, has on occasions been held up to obloquy as a species of destructive Ironside. But

his manner of dealing with his critics, who became too frequently his opponents, was always the same. He invariably gave the fullest consideration to the points of view urged against him, and satisfied himself whether they were worthy or not of his attention; but he was not to be drawn into public controversy, although he was once or twice led to deny absolute misstatements of fact.

That his sensitive nature felt acutely the attacks of a blustering minority there can be no question, but, with a logical mind, he trusted to a logical and tempered judgment prevailing in the long run. In the recent Peterborough controversy he was satisfied with the rightness of his determination as soon as his critics had exposed their hand and their case by the publication of their so-called "specification."

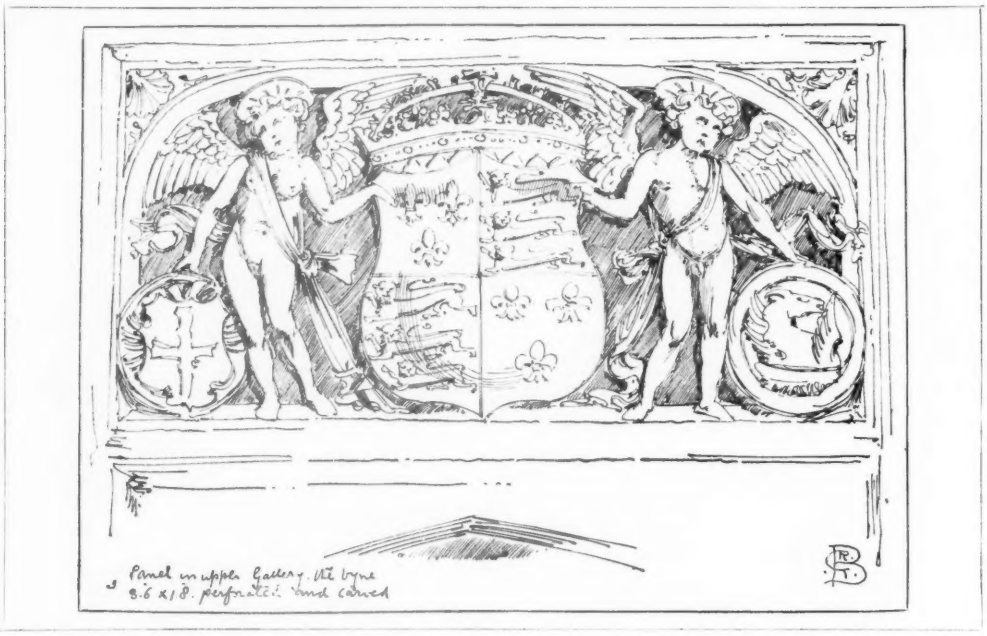
Space does not permit more than a reference to his views regarding the controversy, which ran high at the time, over Westminster Hall. He was always of opinion that the true proportions of the building could only be properly appreciated from the old low level of the ground, but that the somewhat fatuous decision of Parliament to alter the original proportions did great injury to the building.

No happier instance of a commendable reparation to an ancient monument is to be found than the work he contrived in order to keep up the S.W. Tower of Lincoln Cathedral, which at one time seriously threatened collapse. This exercised to the full his capacity for construction, which was one of his strongest features in dealing with new buildings as well as old, and about which much could be written.

This notice is rather of a personal nature than one dealing with individual works. This has already been done in some measure elsewhere. But characteristic examples of the ecclesiastical work with which his name is generally associated are illustrated, and also instances of quite another manner, in which he was equally proficient. His work at Sidney-Sussex College may also be mentioned, the garden front of which, with the Combination Room bay, is specially successful and interesting. His design for a chapel to the same college, unfortunately not executed at his death, was also exceedingly fresh and graceful, and thoroughly collegiate. More definitely classical work was done at Cliveden Hall and at 19 Carlton House Terrace, where the library is a very successful interior in the Italian manner; and after seeing Mr. Astor's offices on the Embankment, one cannot but regret that London has not been more freely enriched by other civic or domestic buildings from the same hand.

It is quite impossible to overrate the charm of Mr. Pearson's personal presence and character. No better instance could be found of the truism that a man's character is reflected or expressed in his productive work. Modest and retiring always, yet full of mental vigour, and evincing a scholarly interest in his art, to his intimates he was a ready talker, with a genial smile and a keen sense of humour—a fine type, in short, of a courtly English gentleman—one of whom no apter words could be used than those recently spoken by the President from the chair: "Everybody who knew Mr. Pearson must have loved him." As he was being laid to rest by the side of the great ones of the past, under the canopy of the Abbey which he loved and served so well, and beneath the brilliantly conceived organ-case which is so happy an example of his tenderness and skill to wrest beauty and fitness from conditions the most hazardous, the solemn office of the dead, rendered without pomp or undue ceremony as befitted his modest life and bearing, but with a perfection recalling his own strivings and ideals, seemed to speak of his attainment—the love of friends, the warm esteem of fellow-workers, the regret of all, and this—the nation's recognition—the most honoured of resting-places, which England bestows only upon her most worthy sons.

Palmam qui meruit ferat.



HUMANIST ARCHITECTURE IN ENGLAND.

By Paul Waterhouse [*F.*], M.A.Oxon.

A History of Renaissance Architecture in England, 1500-1800. By Reginald Blomfield, M.A. 2 vols. 4o. Lond. 1897. [Messrs. George Bell & Sons, Covent Garden]

I SUPPOSE that if it were possible, by some process of absolute and unquestionable appraisement, to select, from among the buildings of the past, two examples of equal merit, the one Gothic and the other of the style which, for lack of a name, we call Renaissance, human interest among persons of proper qualifications would centre more readily on the latter. My supposition applies of course to the present age, which, in the matter of architectural vision, is fairly free from the prejudices of the "battle of the styles." There are men among us who can appreciate with equal discernment (which means with equal knowledge) the products either of the mediæval or of the revived classic styles, and it is in the judgment of such men that I venture to think the difficulty of choice between a Gothic and a Renaissance building of closely competing merits would, after a tottering of the scale, end in the bending of the balance towards the Renaissance work. The reason of this is a thing, accidental, as one might say, yet so persistent in its accidence, that its common inherence on the one side, and its general absence on the other, have become almost qualitative. This thing I had almost described as the attachment to, or absence from, a building of the name of its designer. But this is only half the truth, and if it were true would result in the diminution of our interest in a building by the mere accidental loss of the architect's name. The something which differentiates a Renaissance building from a Gothic one, far more intrinsically than the outward quality of style, is the fact that, speaking generally, and with great and notable exceptions, a Renaissance work is primarily a composition, in fact a work of art, while a Gothic building as often as not is a congeries of detail, perhaps even a congeries of compositions, the

total beauty of which may be due as much to good luck and old age as to human effort, or may even be absent. I say advisedly "with great and notable exceptions," for there are in our own country many monsters of the Renaissance, and not a few mediæval buildings, in which there is evidence of single purpose and complete design. In some cases our Cathedrals have architects' names attached to them, a surprising addition to our interest in any building; and in some there are actually visible those signs of harmonious and unaltered purpose which I have been speaking of as the private honour of the buildings created under the Humanist revival.

Mr. Blomfield has done well in his preface to draw our attention to this word "Humanist," a word which people avoid, being ignorant, for the most part, of its special meaning. But take it to mean what you will, its many aspects of significance have mostly an appropriate bearing on the architectural work of the Renaissance. Indeed, this very fact, that a Renaissance building is generally, in its whole effect, as well as in its parts, the product of a single human brain, gives the opportunity for at least a secondary and not very far-fetched application of the term. It is a snobbish thing to attempt a comparison between Westminster Abbey and St. Paul's Cathedral; but if one chooses to analyse one's feelings upon the two buildings the result is I think inevitable. I assume that the critic who sets about the task will kindly divest the Abbey of historical association, which is not architecture, and will divest his mind of the narcotic influence of antiquity, which is not architecture either, though it may be an evidence of good masonry. Strip the Abbey of these accessories, and of such of the tombs as are not additions to its beauty, and you get, for purposes of comparison with St. Paul's, a piece of very beautiful agglomerate. Both buildings you will admit have faults, both have marvellous beauties. In the case of the Abbey you are forced to acknowledge that the building both gains and suffers from the fact that its general effect is due not to an individual's intent, but to the ebb and flow of circumstance. Looking at St. Paul's, you say the faults are the faults of a man, and of the same man who was great enough to conceive the whole. In the creation of a Gothic cathedral man takes the place of the coral insect. One is awed by an immense sense of the effort—corporate, religious, continuous, and traditional—which has produced by accident, or more likely by inspiration, so beautiful a result. In face of a St. Paul's one is astounded at the greatness of individual man. Possibly the former is the higher sentiment; but I do not think the latter need be antichristian: it certainly has its humbling as well as its inflating effect; and I only know of two living architects, not our greatest, who have invited comparison of themselves with Wren.

Let these thoughts pass as prefatory welcome to a book on the English Renaissance. It will perhaps be granted, by those who understand these things, that no man is capable of worthily criticising architecture who has not to some extent agonised over a drawing-board. This is not by any means an admission by way of corollary that the effusions of an architect's leisure are usually sound reading; indeed, so far is this from being the case, that it is well to lose no time in allaying all apprehension on this score. Let me say at once that Mr. Blomfield, though we know him to be no idler in architectural practice (I use the word in an Aristotelian, not in a mercantile, sense), has produced a book which is at once sound, historical, systematic, and, as far as need be, complete. That it should include every example that anyone can imagine as appropriate to the subject and period is alike impossible and unnecessary. Outwardly and bibliographically the work calls for high praise. It is in two volumes, a necessary tribute to the laws of gravitation and human dynamics, each volume being as big as one can conveniently handle. The illustrations, of which more is to be said, are for the most part good, and in many cases of high merit; the print is excellent, and there are no frontispieces, nor have two of the plates been singled out for the negative favour of being

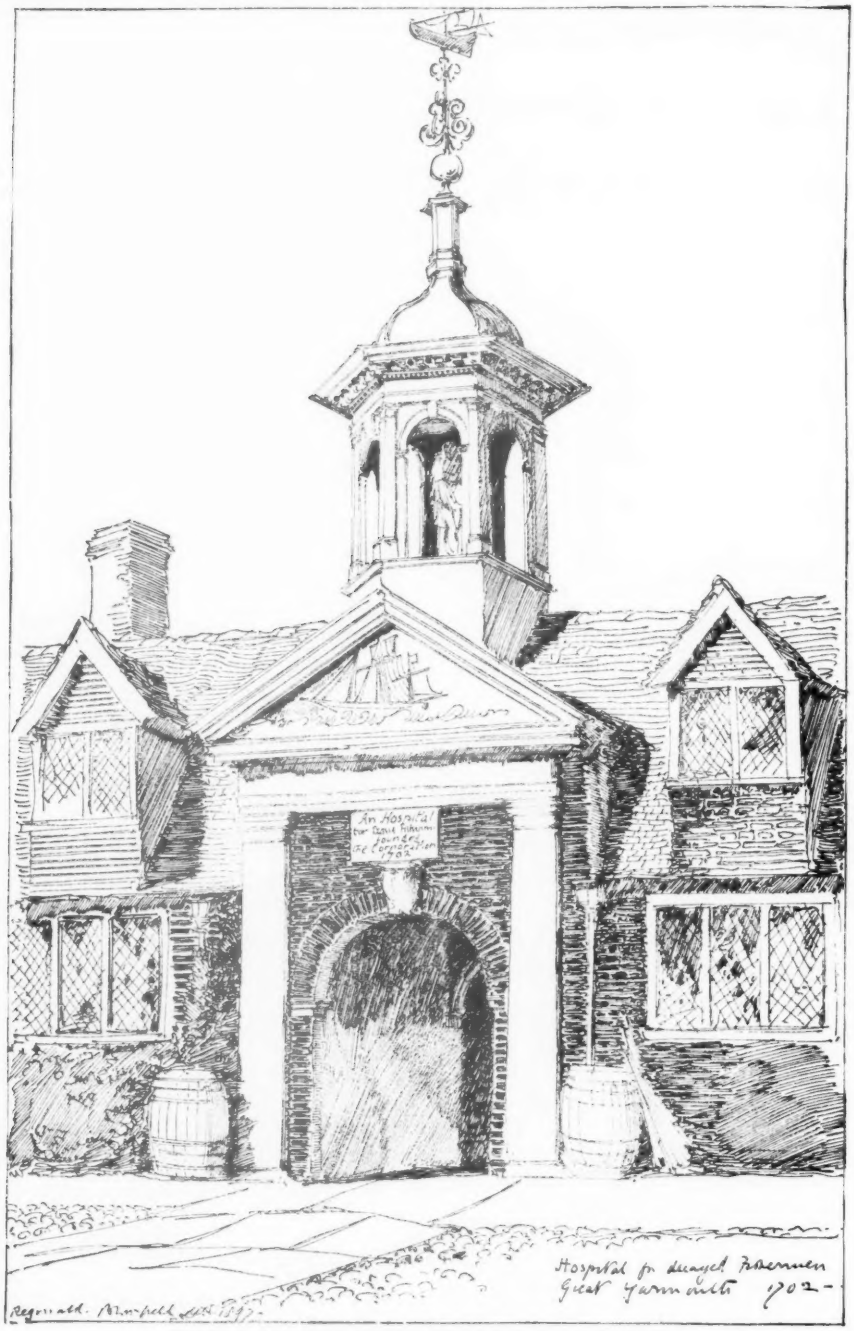


FIG. 1.—CUPOLA TO HOSPITAL FOR DECAYED FISHERMEN, GREAT YARMOUTH.

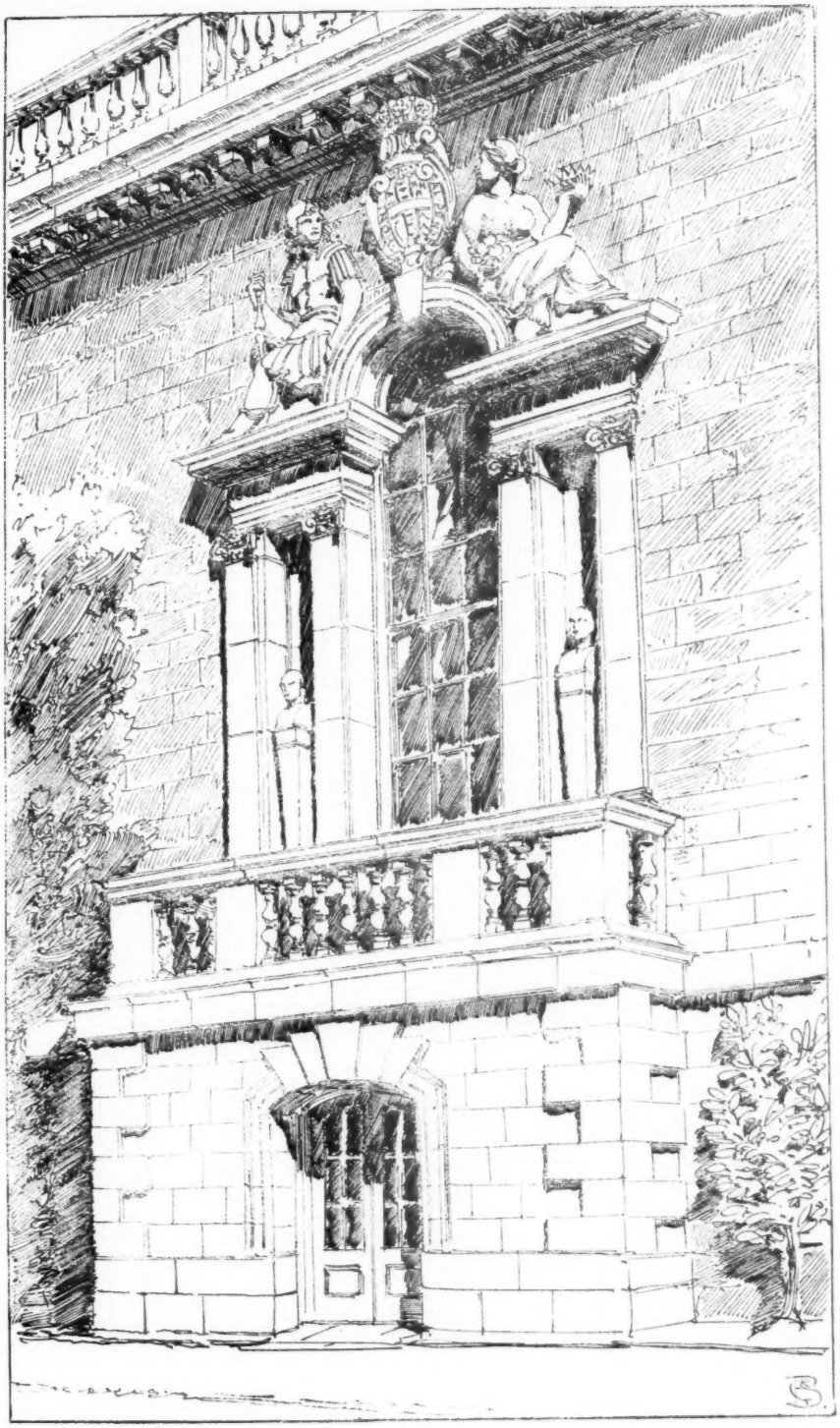


FIG. 2.—CENTRE BAY TO SOUTH FRONT, WILTON.

printed in gold (that is in reversed chiaroscuro) on the outside of the volumes. In other words, Mr. Blomfield's publisher has not insisted on his making a technical treatise into a "gift-book." On the other hand, there is a good deal in the clearness of the writing and the picturesqueness of the original illustrations which will make for the book's popularity among laymen, and add encouragement to the ever green but ever rotten hope that we are going to educate the public into a right understanding of our craft. Mr. Blomfield, to do him justice, makes no such pretence; and probably shares the view that architectural knowledge is not for the million; but he will not be sorry to think that he is opening the eyes of many who are not architects to the existence of design in buildings which they had previously taken for granted as uninteresting and unspeaking facts. This, at least, is a service that an architectural writer may do for the public without attempting the longer and probably futile task of planting knowledge in plots where there literally is not room for it, even if the soil be good. I only mean that architecture is too big a thing to be any man's by-work.

For the amateurs, past and present, who, not content to be lovers only, have proceeded to do violence to the object of their affection, Mr. Blomfield has some hard raps. He goes so far, and many will go so far with him, as to assert that "if buildings of good proportions and correct detail are assigned to amateurs, one may be pretty nearly certain that the name of the real architect has been withheld. It is certain," he says, "that such knowledge as may be acquired by travel and the admiration of buildings, even when joined to a real interest in the art, will not enable the most gifted amateur to design and successfully execute even a correct academical exercise in building. The amount of practical and technical knowledge necessary to such a comparatively simple matter as this is very much greater than the layman imagines." It will be easily understood that these general strictures have, in Mr. Blomfield's book, a particular application to the architectural claims of Lord Burlington, and, in a less degree, to other noble amateurs of the eighteenth century.

The author takes, as the limits of his subject, the three hundred years which start from 1500. He begins by giving some amount of orderly arrangement to the rather chaotic period which preceded Inigo Jones. This he effects by introducing a national classification among the early workers of the English Renaissance. First come the Italians—Giovanni de Majano with his "rotundæ imagines" at Hampton Court; Peter Torrysany (Torrigiano), whom we used to know in the Rolls Chapel; Rovezzano, Englished into Rovesham, who worked at Wolsey's tomb; John of Padua, whose fame may be spurious, and the many artists whose names are forgotten though their works remain. With Elizabeth's reign came the Germans, whose influence is sometimes overlooked; not only in practice, but in precept, was the work of her reign controlled by Germany, or by the designers and writers of the Low Countries. The *Architectura* of J. V. Frisius, published in 1563 at Antwerp, assumed, as Mr. Blomfield points out, the importance which in other periods has been accorded to Palladio and Vignola.

The succeeding chapter, which treats of Englishmen's own efforts in the direction of the new style, is better reading for patriotic students, who will find that the author has conscientiously but not tediously lifted the controversial mists which surround the persons of John Thorpe and his contemporaries. After an interlude devoted to the topic of house-planning in the sixteenth century, and to the state of architectural literature, Mr. Blomfield raises the curtain on his great hero, the immortal Inigo Jones. His hero-worship is warm but not extravagant; and if some of us have a blinder admiration for Wren than Mr. Blomfield can accord to him, we shall still be unprepared to find fault with the supreme influence which he attributes to the earlier artist. There is room for both men in our grateful affections, and few will deny to Jones's memory the tribute which the author pays him of being "one of the most accomplished artists that this country

FIG. 3.—THE TOWN HALL, ABINGDON.

has ever produced." When the voice of Europe proclaimed him "Vitruvius Britannicus," the voice of Europe certainly understated its meaning. One might as well dub John Bright the "English Quintilian." No one but an architect can ever appreciate the true nature of the service which Inigo did for English art. He was not a mere introducer of a foreign method, as many would think. His strength lay, as Mr. Blomfield puts it, "in his thorough mastery of proportion, his contempt for mere prettiness, and the rare distinction of his style"; his ideal was, in his own words, that architecture should be "solid, proportional according to rules, masculine and unaffected."

The chapter on Inigo Jones is followed by one on Webb, Marsh and Gerbier, and this leads up to the very complete and critical chapter on Wren, which closes the first volume. Mr. Blomfield handles Sir Christopher with a cool judgment, and may fairly be said to have exhibited those powers of valuation and analysis without which a short essay on a big man cannot be made either successful or useful. Brief as is the space allotted to the theme, the author shows in this chapter that he writes not as a transcriber, but from full knowledge, and he has clearly been at great pains to realise not merely the result of Wren's work, but the motives which underlay it.

If Mr. Blomfield has been happy in writing of Inigo Jones, he no less enjoys himself among the smaller celebrities who fill his second volume. I am glad to note his admiration for Gibbs. The Radcliffe, St. Martin's Church, and St. Mary-le-Strand are buildings which, I confess, fill me with new astonishment every time I see them. They are works which stand admirably firm against the test of reiterated acquaintance. Honour is done to Vardy by the publication of a very fine photograph of Spencer House. Kent gets his deserts, a measure of praise and blame; the Woods of Bath are brought out of their provincial hiding, and Dean Aldrich, amateur though he was, is allowed without dispute to claim the buildings which commonly bear his name.

In the five closing chapters of the work the author wisely changes his line of action in order to gather together certain aspects of his subject which do not naturally fall under the subdivision by architects' names and by dates. He first follows up his chapter on sixteenth-century planning by a chapter on house-planning in the seventeenth and eighteenth centuries, and next writes upon the architectural literature of the same period; under this head come the well-known *Vitruvius Britannicus*; Aldrich's little known *Elementa*; Gibbs's interesting folios on his own work; Ware's *Book of Designs by Inigo Jones*; Chambers's Treatise; Leoni's *Palladio*, and the *Works in Architecture* of Robert and James Adam. The book which "the brothers" produced on Spalatro is not mentioned, probably because the author is confining his bibliography to works on British architecture, or on general architectural precepts. The "Conclusion," which is a brief and clever survey of the whole period, is preceded by two technical chapters on certain particular trades and materials.

The book, as a whole, has few faults: a little more in the way of reference would have made it more useful to the technical or archæological student; but then it would have been more tedious to the general reader, who will probably be content to take Mr. Blomfield's word. From a scholastic point of view, I object to the architectural use of the preposition "to" meaning "of." That Mr. Blomfield employs in the titles of his drawings such expressions as "cupola *to* hospital" will go some way towards reconciling me to the solecism, for one cannot read the book, which, take it as you will, is a great and well-accomplished enterprise, without respecting alike the energy and the judgment that have brought it to completion, and the distinguished powers of draughtsmanship and prose which have made of the book, not merely a treatise with illustrations, but a combination of Art and English.

9, CONDUIT STREET, LONDON, W., *8th January* 1898.

CHRONICLE.

BRICKWORK TESTS.

Further Observations by Members of the Science Standing Committee, and Discussion on the Report of the Third Series of Experiments.*

The President, PROFESSOR AITCHISON, A.R.A., *in the Chair.*

Prior to the discussion on the Report at the Meeting of the 13th ult. Mr. Max. Clarke [*A.*] read the following statement:—

A number of questions as to the manner in which these experiments were carried out have been asked, both in this room and in the building journals, and as yet have received no direct reply. I have collected them in groups, and without troubling you with the actual questions noted, will give you whatever explanations and observations my share in the proceedings and my notes thereon will allow me.

At first the bricks were left for a time in a tank of water, and used as wet as possible. But it being found that this made the mortar so wet that the pier would not remain steady, water was poured over them as they lay alongside the bricklayers, having been wetted previously in the stack.

As regards the character of the brick, the Stocks looked above the average; those broken were used for closers. The other bricks are fairly described in the JOURNAL, and I have at the previous Meetings made some observations on the Leicester bricks and the Flettons.

The sand was Thames sand, all sifted and washed, and *all* of it of better quality than that used in ordinary work.

The lime mortar was made, as already stated, in the proportion of one of lime to two of sand; the lime was well-slaked stone lime, not ground; made by hand, not mill mortar. The proportions were carefully measured—one to four of cement.

In the first series of piers the work was grouted, so far as I could see, according to the instructions, every third course. In the substituted piers and all sections of walls *every* course.

The thickness of joint was about ¼-inch; rather more than that in the Stocks, and about that in the others; so that the brickwork should be nearly four courses to the foot. The highest for the twenty-four courses, as far as I recollect, was 6·1¾ for blue bricks; for the majority, about 6·0½.

Frogs were in Flettons and Stocks laid frog upwards. We had no funds to continue the experiments, as suggested, with bricks having frogs and those without them.

The piers were started off the iron plates on a bed of mortar about the thickness of an ordinary joint, and finished on the top with the same; those in cement having cement beds and tops.

In the case of the substituted piers the tops were finished with plaster-of-paris; all perfectly level on the top, with the exception of two in the first series, which were not quite fair on the top.

Sheets of felt were put in between the cross-head and the top of pier; and, as stated in the previous report, we had a lead casting made to level the under-side of the cross-head or girder, which was rendered slightly concave by being over-tested at the Glasgow works where the machine was built.

With regard to Mr. Walker's questions as to the state of weather, or hygrometric conditions, during the building of the first series of piers in July and August 1895, speaking generally it was damp with some heavy rain, only on one day was the sun out and warm.

On 9th, 10th, 11th and 12th March 1896, when the second series was built, the weather generally was damp; there was a good deal of rain—no warm weather or sun. The piers with "A" after the numbers are the substituted ones.

The weather during the building of the third or "Wall" series, 19th October to 13th November 1896, was fine nearly all the time, but not at all warm; damp at times. All the piers were covered with felt on the top to protect them from the beating rain.

With regard to the Gault bricks and piers, it has been asked whether there were any soft bricks in the heart of the piers. Only in one case, and that is noted in the Report on the first series [Vol. III. JOURNAL, p. 342].

In answer to another question: Is it not curious that there is little difference between the starting of failure and final collapse? I reply, not so. In the harder and tougher bricks the signs of failure are not observed until the greater portion of the load is applied. This is to be specially noted in the case of the half blue brick tested by Professor Unwin, which carried a load of 100 tons for some minutes and then failed suddenly as if it burst. It is also to be observed in almost all the piers built of harder varieties of brick.

As to the question about not getting 1,000 bricks laid per day if ¾ bricks were used, it is admitted that bricks 6¾ inches, if used for closers,

* The Report, Tables of Results, Illustrations and Appendices, read or explained at the Meeting of the 13th ult., are printed *ante* pp. 77–100.

would be more difficult to handle than those 4½ inches wide; but the time taken up in laying them is exceeded at present by time occupied in cutting closers and laying them. At any rate, we do not expect nor do we get 1,000 bricks laid per day in work with any pretension to be called good, and the sooner that is admitted the better.

One other point I should like to call the attention of members to. It has been suggested that there *must* be some error in the whole series of experiments, and that they are therefore worthless. Many people have made this statement at various times on various subjects, although their actual knowledge on the subject has been limited.

Now, if there is an error, what is it? I have given some consideration to the subject for the past week. A contractor having asked my advice as to the failure of some brick piers on which a girder rested, I at once inquired as to the nature of the bricks, and the reply was "red bricks." "Good or bad?" I asked. "Middling," he replied. This I thought was what the average man would say in th future. So I thought it worth trying how our experiments would work out against those made at Watertown, from the tabulated statement given by Professor Unwin in the first Report [Vol. III. JOURNAL, pp. 351-52]. We there find it stated that the crushing load of "Bay State medium bricks" was 730 tons per square foot, which is about equal to that of the average of our best—viz., Staffordshire blue bricks. The crushing loads of two piers built of Bay State bricks are given. One, built in 1 of Portland to 2 of sand, gives a crushing result of 115 tons per square foot, and the other, built in 1 of Rosendale to 2 of sand, gives a result of 126 tons per square foot.

Turning to our Table, you will see that the sections of walls built with blue brick in cement give a result of 139 tons and 131 tons respectively, which sufficiently approximates to the American result to merit confidence in the series.

Another point I would like to call your attention to is that, taking the crushing loads of the hard burnt face bricks in the American series and the crushing loads of piers built of them, a simple proportion sum brings out a result which is approximate to our actual result.

So far as I know, this American series of tests is the only one on any scale which compares with our series, in giving enough particulars by which the strength of any bricks may be compared with the strength of the piers, from experiments made with other bricks; but this is perhaps anticipating the conclusions to be arrived at as a result of the whole series.

I have dwelt before upon the great difference in the quality of the workmanship. The note made in my diary of the work on 25th July 1895 reads thus: "The closers in the centre of the piers were very roughly cut or broken, just as would occur in a brick pier where ordinary contract work was being done. Instructed the men to grout the work every third course."

In the substituted piers and the lengths of walls we report upon to-night, I not only gave instructions that the work was to be built in the very best possible manner, regardless of cost, but either I or some other member of the Sub-Committee saw most of it done, besides having a competent clerk of works upon the spot all the time the walls were being built, and the results seem exactly what might have been expected.

So far as I can see, the great difference between this series of tests and any that have been carried out before, is that the size of the blocks tested have been very much larger, and, so far as the first series go, built in an ordinary manner, but still very much better than one would get in ordinary practice. The result goes to prove that the statement given in Hurst and Rivington, as to the crushing loads of brickwork, only applies to the very best quality of work and materials; and this is fully borne out by the results given on this and on previous evenings. We now know that a blue brick pier, if built in a first-rate manner, will take 50 tons per foot without any signs externally of failure—how long it will remain so is still a question.

I consider the tests also prove that we should never use Stocks, so-called, for large or lofty buildings subject to heavy loads. To my idea they are quite unreliable, and only fit for small works. In any building where Stocks are being unloaded, no one can help observing the very large proportion which are broken in transit; and yet we put in our specifications, "no broken bricks are to be used." The real way to deal with the matter for important buildings is to forbid their use at all.

No one would have thought how very much to the point the remarks of the President this day last year would be to-day as to the action of fire on mortar and cement, and I think it would be of service to us all, if, at the inquiry now being held as to the fire in Cripplegate, it could be ascertained which buildings, if any, were built in cement, and whether they suffered much more damage than those built in mortar.

One small point has been suggested by persons not connected in any way with the experiments—viz., that the gauge was in error. This is disposed of by the fact that, at the suggestion of Professor Unwin, both the gauges used were tested on the completion of the last series, and the results show that, although neither was absolutely correct throughout its range, the inaccuracies were not sufficient to cause any material difference in the results.

You will observe that in the above remarks I have only dealt with the practical side of the question. On the scientific side I say nothing, as

I consider having the advice and assistance of Professor Unwin on the whole matter is quite sufficient guarantee against error in that direction.

There are members who think that if the load had been applied at the top of the pier instead of at the bottom the result would be very different. No answer, I am afraid, would satisfy these gentlemen. Unfortunately, I understand the machine has left the Docks, so we cannot offer to turn it upside down for their benefit.

The Sub-Committee, I imagine, quite recognise that it would be very satisfactory if tests could be made with the cubes of brickwork, as suggested by the President last December; but not only are the funds exhausted, but a balance is due, although the original sum stated—viz., £200—has not yet been spent; and, personally, I have found that seeing to the work, taking and preparing the photographs, occupies so much time that I can ill afford, that I should not care to undertake another series under the same conditions.

I only wish to bring one other matter before your notice, which is, that in dealing with tests of single bricks great care must be exercised. I was so much struck with a paragraph in the *Builder* of the 4th December, which was the statement of a manufacturer that the crushing load of a Fletton brick was 230·7 tons, that I at once asked Professor Unwin if he would test two more Fletton bricks to confirm the crushing load given on page 100 [JOURNAL, Vol. III.] of the second report, which was as follows:—

Single brick . . .	50·23 tons crushing.
" " . . .	50·95 " "

The results of the two Professor Unwin was kind enough to test on the 9th December were:—

Single brick . . .	44·52 tons crushing.
" " . . .	46·11 " "

which sufficiently confirm the original figures, and leave no doubt that it is a very exceptional Fletton brick which will stand a crushing load of 230·7 tons.

MR. P. GORDON SMITH [*F.*], Chairman of the Science Standing Committee, said that additional interest attached to the last series of tests by reason of their having been made upon lengths of actual wall as distinguished from ordinary brick piers. The results, he thought, answered all their expectations. He wished the Committee had had a little more money to carry the experiments a little further. He asked the Meeting to put on record once more their renewed thanks to Sir William Arrol for the great help he had afforded the Committee, to Mr. Donaldson, the Engineer of the Dock Company, and to those members of the Committee who had given up so much time in looking after the experiments.

PROFESSOR UNWIN [*H.A.*], F.R.S., said they had come together to record the completion of work which had taken something like three years between the conception and carrying out, which had involved a good deal of co-operation between many people, and which he was quite sure would prove to be practically of very considerable value. Although he himself had not been much down at the Docks, he could say from observation that some of the members of the Committee had given up much time to the proper carrying out of the experiments. There was one point on which he might say a word. The arrangement of the experiments was carried out by a Sub-Committee under the direction of the Science Committee, and a great many members both of the Sub-Committee and of the Science Committee had taken part in carrying out the tests. In only one single respect was there a little difference from what in his experience had hitherto been the ordinary procedure: there was really no report which could be called the report of the Committee. The report before them had been made by two members of the Committee. He did not complain of that arrangement. It had saved some trouble, and he should be the last to suggest that Mr. Street and Mr. Max. Clarke had not been the two of those concerned in the experiments who had given most time and most trouble to the work; but he was obliged to say what he had said, because he was going somewhat to criticise the way in which the results had been put forward. Personally he would rather have discussed the analysis of the results in Committee beforehand. As this was the last of the reports, and as he supposed the last report to appear in the Institute JOURNAL, it was rather a pity that some matters to which attention had been called had not been noticed. To take a small matter first: after the second series of tests, analyses were made of the lime mortar and cement mortar used in the piers. He had pointed out a year ago that there were some errors in the heading of the table containing those results. He thought some reference should have been made to the fact that those headings as they stood were nearly unintelligible. To come to a more important point: a year ago he objected to the tabulation in the Report of the results of the first and second series of tests, and it might have been well if in this final report some attention had been given to that point. He thought the way in which the results were put forward a year ago completely confused the teaching of the results. He would recall a little of the history of the three series of tests. Quite at the beginning, before anything was built or any actual arrangements made, he, as an old experimenter in work of the kind, drew attention to the necessity, in making the tests, of an exact supervision of the quantities of sand and lime used in making the mortar, and of the actual way in which the mortar was made and used. He was told at that time by some colleagues, who had really more

interest in the subject than he had, that that was not in the least what they wanted, and that they wanted to test piers made in the most ordinary way, and that therefore it would be improper to take any special care with these points. The result was, that the first series of piers were built in a very ordinary way, and those gave, as he would presently show, not very good or uniform results. It was even now a little impossible to tell exactly what was done at that time. The Committee themselves were so far dissatisfied with the results that they had certain piers rebuilt. The second series of piers was built with much more supervision of the work of building, and especially of the way in which the mortar was mixed and used. He understood at that time that in the building of the second series of piers better sand was used than in the building of the first. Mr. Max. Clarke had written to him afterwards, saying that he thought he (the speaker) was mistaken; but even Mr. Max. Clarke did not seem to be quite certain of the matter. Whether the same sand was used or not, there was no question that the mortar in the second series of piers was very much better than the mortar in the first series. The mortar in the first series after three months crumbled in the hand—both the cement and the lime mortar, and he was quite certain that a very much better mortar was used in the second series of piers than in the first. When, finally, there came to be built a third series of piers in the shape of short walls, a quite new and a very much better quality of sand was obtained for making the mortar. A very small sample of this sand was sent to him, out of which he could just make two cubes for testing, but not enough to get average results, and he had handed in the results of those tests [see p. 100 *ante*]. The tests of these two cubes of new sand gave a better result than cubes made with the same lime and cement and with the standard sand used in testing, so that there was no question whatever that the third series of piers were built with excellent sand. From what he had seen one day at the Docks, the mortar, also, was very much better than the mortar in the first series of piers. In the third report there was absolutely no reference to the fact that a quite new and different sand was used in the mortar employed in building the third series of piers. He attached very great importance indeed to the quality of the mortar, and he believed that a very large part of the difference of the results in the different series of tests which had been obtained was not due even to the fact that there were a few soft brick closers in hard brick piers, but was due almost exclusively to the difference in the quality of the mortar. So much for the history of the matter. Before going into a discussion of the results, he would say a word or two about the general bearing of the results, first touching upon one or two points of the report. The report stated: "The Committee do not propose at present to give any fixed rules based upon the results or information gained by these experiments, as it is hoped that the Council of the Royal Institute will sanction the preparation of a careful analysis of the facts contained in the three Papers, and issue the same in a suitable shape." Now, he thought if the report had come before the Committee for discussion first, he should have said that the Committee were abdicating their proper functions in refusing to discuss their own results. Those who had carried out the experiments, and who had got in mind all the data, were the best persons, initially, at any rate, to draw conclusions from the results. Happily the writers of the report had not been quite consistent, because they had proceeded to draw some conclusions. He had not much to dissent from in the general way in which they had summed up their results. There was one conclusion, however, which really depended entirely on tests of his own, but which he certainly should not have drawn. Two Staffordshire brick piers gave way with somewhat different loads, and that was explained by saying that the bricks of which the 27 inch by 18 inch piers were built were very much stronger than those from which the 18-inch square piers were made, the bricks tested failing respectively at 779 and 701 tons per square foot. Now the 779 and 701 were figures obtained by him in the laboratory at Kensington. The 701 was the average of five or six tests of five or six bricks from one lot, and the 779 was a single test of a single brick taken from a second lot. He should not have drawn the conclusion from the test of a single brick that the second lot of bricks was stronger than the first. It was only a small point, but it was just one which experience in testing made one careful about. The Committee, again, while disclaiming the desire to set down any fixed rules, had drawn up what really amounted to fixed rules about the strength of brickwork, and they had laid it down that stocks in lime mortar would carry so many tons per square foot, and so on, and they said that they had got those figures by taking one-fifth of the crushing loads which were observed in the tests. They ought to have said two things: first, that that would not in any case apply to piers less than three months old, which was a very important point, because in a great many cases it was not the strength at three months but the strength at one month which had to be looked to in deciding whether brickwork would stand the work it had to do or not. They ought to have said one thing more, namely, that those figures were deduced entirely from the second and third series of tests. So much in the way of criticism. There was one point which he was sorry to have to explain now, because he had explained it a year ago privately.

If they simply took the results and tabulated them in the most simple and straightforward way, they would be found much less anomalous than at first sight they appeared to be. He spoke a year ago as to the anomalies of the experiments, and he was partly misled by the way in which the results were tabulated. He had drawn up a table to show

CRUSHING STRENGTH IN TONS PER SQUARE FOOT.

Mortar	Age. Months	Stocks	Gault	Fletton	Leicester Red	Stafford Blue
Single Brick	—	84	189	221	362	780
Sand Pier	—	—	—	—	15	—
First Series						
Lime	3½	10·4	21·9	—	30·7	74·3
	10	12·5	21·6	—	34·1	73·7
Cement	3½	14·9	17·8	—	58·5	72·8
	10	19·7	30·0	—	50·4	82·5
Second Series						
Lime	3½	18·3	—	—	—	—
Cement	3½	—	49·6	—	86·4	103·1
Third Series						
Lime	5	18·6	31·1	30·7	45·4	114·3
Cement	5	39·3	51·3	56·3	83·0	135·4

second series. The stock bricks in the first series broke at 10 tons per square foot, and in the second series they carried 18—that is, they had a better built pier, a pier with a better mortar in it. There was no question about the mortar being better. The gault bricks built in cement at 3½ months carried in the first series 17 and 18 tons, and in the second 49. The Leicester reds carried in the first series 58 tons, and in the second 86. In the first series the Staffordshire blues carried nearly 73 tons, and in the second series 103. It was obvious on the face of that that the whole of the piers in the second series carried about 50 per cent. more than those in the first series. That he attributed entirely to the care taken in the preparation of the mortar; and at any rate, whether that were a true explanation or a false explanation, it was quite clear that the results on the first series must not be mixed up with those obtained from the second series. The mischief in the table in the Report on the second series of tests was, that two series of quite distinct results were averaged together. Averages had been taken, one of No. 1 series and one of No. 2; next to that stood two of No. 1, and in another case two of No. 2, so that two quite distinct series of results had been mixed up and averaged indiscriminately. Coming to the third series of tests, there was no question about the mortar being very good in the third series; it was made with better sand, and no doubt was very good mortar. The third series agreed almost exactly with the second, wherever there was a possibility of comparison. The stocks in lime carried 18·3 in the first series and 18·6 in the second, with a little difference of age. The gault bricks carried 49·6 in the first series in cement and 51 in the second series. The

that the discrepancies and anomalies were not nearly so great as they appeared to be in the table of results of the 18-inch piers in the last Report. In his table he had kept together all the piers of the first series which were made at one time; all the second series made at another time, and all the third series which were made at a third time. Taking the first series alone, they were bad results on the whole, but there were no serious anomalies about them. At 3½ months the stocks in lime carried 10 tons per square foot, and at 10 months 12½ tons. In cement at 3½ months they carried nearly 15 tons, and at 10 months nearly 20. Those were perfectly consistent results. With regard to the harder brick, the gaults in lime carried 21 tons per square foot, both at 3 and 10 months, the difference there being probably that the second pier was not quite so well built. There were no great anomalies in the other figures in the table—17·8 and 30; 30 and 34; 50 and 74; and 73 and 82; the results were not absolutely regular, and there were anomalies, but there were not differences very unexpected in testing rough materials like brickwork. After the 3½ months series was completed, it was decided to build some piers like some of those previously tested to see if better results could be got. He did not quite know why certain particular piers were selected to be tested again, but at any rate there were the results of the four piers which were built in the

Leicester reds carried 86 in the first series and 83 in the second—a difference of no moment in an experiment of that kind. The Staffordshire bricks in cement carried in the first series 103 and in the second series 135—a difference, but not a very serious one. The third series agreed entirely with the second series, and within the limits of ordinary errors in such experiments it might be said that the second and third series gave identically the same results.

Mr. WILLIAM WHITE [*F.*], F.S.A., expressed his great gratification at hearing Professor Unwin's explanation. There was not nearly enough allowance made in ordinary work for its stability, both as to the quality and quantity of the mortar and the mode in which it was made. In such tests it was absolutely necessary that all the circumstances should be as equal as possible throughout. It was only by testing those special things—the tests made at one time, the tests made at another time, and the tests made at a third time—all separately, that any proper reliable average could be obtained.

Mr. WILLIAM WOODWARD [*A.*] said that Professor Unwin's observations rather confirmed the remarks he (Mr. Woodward) made last year as to the unreliability of the tests made in the first instance. Professor Unwin had shown them that the second and third tests were practically alike, and if they could only secure, as Mr. White had suggested, precisely the same conditions as regards quantity and quality of the sand, the amount of mortar and the thickness of the joint, the character of the grouting, and the quality of the brick—if they had the results as regards the size of the pier, and as regards the weights placed upon it, and the time occupied before the test was made, he felt sure that the efforts of the Committee, for which they were all exceedingly grateful, would be certainly some of the very best efforts the Institute had sent forth. He was sorry that the funds of the Institute were not sufficient to have resulted in a complete test. He thought that after the valuable explanations of Professor Unwin and the labours of the Committee, if it were properly put to members, sufficient funds would be forthcoming to enable a fourth test to be made, which would give results enabling them properly to gauge what should be inserted in their specifications with regard to construction and materials. He thought that funds would also be forthcoming for the purpose of further experiments of the greatest value to architects —experiments to be confined simply to granite, Portland stone, Red Corsehill, and Bath.

Mr. DOUGLASS MATHEWS [*F.*] asked why one-fifth of the crushing load was taken? He was under the impression that a fourth was always taken, and he could see no reason for taking a fifth.

Mr. BRUCE J. CAPELL [A.] said that Professor Unwin had said that he did not understand exactly on what principle, in the second series, particular piers were taken for testing. He (the speaker) had only his recollection of the papers read on previous occasions, but he thought it was accurate, and he believed, with regard to the pier of stock brickwork in lime in the second series, it was explained to them that on the first occasion when the pier in lime was tried, the water was admitted somewhat with a rush, and the pier crushed with the rush, and in such a manner as gave no opportunity for exact measurement, or exactly making the test. The second pier that was tried was one of gault bricks in cement, and he thought it must be pretty obvious why they tried that. It seemed to him rather a considerable anomaly that a pier built in cement crushed at 17·8 while a similar one in mortar crushed at 21·9, the one pier thus crushing with 20 per cent. less pressure than the other. With regard to the others there seemed to be somewhat similar anomalies. They perhaps did not go beyond the margin which might be allowed for the purpose, but they were rather striking. The pier built of Leicester reds, built in cement, crushed at 86·4 in the second experiment, whereas the previous one, one at ten months old, failed at 9 tons lower than the one at three and a half months old; not a thing that most of them would have expected. In the case of the Staffordshire stone, they found that both the Staffordshire blue bricks, the one at all events in cement, failed at a lower pressure than the one in lime. He did not speak for the Committee at all, but he thought it reasonable that they should make the further experiments of the second series, as they seemed anomalies to an ordinary professional man—one not accustomed to scientific experiments. The second series, Professor Unwin said, showed no anomalies compared with the third—showed very little difference, in fact. The second series compared favourably with the third in many respects, and the second, he (the speaker) thought, were built with the same sand as the first experiments, the third being built with a highly superior article. If that were so, then the second experiments with the inferior mortar seemed to be pretty well on all fours within a reasonable margin with the experiments where they had the best possible mortar.

The PRESIDENT said that it seemed extraordinary that when experiments were made on brickwork in mortar, the mortar used was such that no architect who had any acquaintance with building would ever employ, although it was employed in the last century. No one would now think of using mortar for any work where strength was wanted that had only 2 of sand to 1 of lime; they knew it was about of equal value to mortar with one-fifth of lime, and that mortar with 3 of sand to 1 of lime was about twice as strong as when it had 2 of sand to 1 of lime, and there was very little difference in strength between mortar composed of 4 of sand

and 1 of lime and that of 3 to 1. The variations in experiments must always be great, because materials vary, whether natural or artificial. Bricks, for instance, are never perfectly homogeneous nor alike; so that if a proper average were wanted, a very large number of the same sort of bricks must be experimented on. He was not quite so sure as Professor Unwin seemed to be that the Committee were wrong in having in the first instance the piers built in ordinary work; for, at any rate, it gave some criteria as to what percentage must be allowed for ordinary work as compared with that built for experimental purposes. It was easy to get hold of a good bricklayer, and if he were told that the pier was wanted for experiments in strength, get him to lay the bricks well and to fill all the cross joints; but if he were told that he must get the pier done in as short a time as possible, he never thought of thoroughly filling in any of the cross joints. Although there was some little use in grouting, he thought the principal use was that some damp was left in the brickwork so that the mortar might crystallise instead of going to powder. Vitruvius told them to be very careful in building rubble walls that there was plenty of mortar, because, he said, if they did not attend to that the core absorbed all the water out of it, and in a very few years it would be found to consist of stones and dust, while if there were plenty of mortar, then the mortar would get harder than the stone. That all knew who had seen houses of the last century pulled down; there was no adhesion whatever in the mortar, and directly the weight of the roof was taken off the bricks could be picked out with the fingers. Architects and others were under a very great debt of gratitude to the Committee for the trouble they had taken. The results, especially in the harder sort of brick, were being constantly used now by persons engaged in large building operations, and however unfortunate might be the results as far as comparison went, still there was something to go on, whereas before these experiments there was a great deal of guesswork. The tendency of the present time was to base all their figures upon careful experiments. People did now what Machiavelli did for moral action; he did not trouble himself about what ought to be, but what was. Now if architects wanted to know what a thing would bear, they tried it; they took a considerable number of similar experiments and struck an average; by these means could be seen what picked specimens would really bear, and by that method an approximation was obtained much nearer to what was wanted than could be got by any other means. He concluded by proposing a vote of thanks to the Committee for all the trouble they had taken.

MR. MAX. CLARKE [*A.*], in reply, said it was an absolute fact that the first and second series were built with absolutely the same materials out of the same heaps. For the third series Messrs. Cliffe sent a particularly good sample of sand, which on the morning of the 6th November 1896 was exhausted, and he went to the dock foreman, and asked him if he had any sand with which to finish the piers, and he said he had. He found it, however, so very inferior to what they had been using, that he telegraphed to Mr. Street that the new sand was very inferior, and asked whether they should proceed or wait for good sand. Mr. Street wired to wait good sand. The work was stopped, and Messrs. Cliffe sent another consignment of sand which was not quite so good, but very nearly. That was the explanation as to the sand.

MR. WILLIAM C. STREET [*F.*] said that, with regard to Mr. Douglass Mathews's question, the figure of a fifth of the crushing pressure was suggested in the Report, because it was considered that the compression of the mortar under that amount of pressure indicated that the brickwork was then undergoing a strain quite as large as it ought to bear. They knew very well that very much heavier weights than a fifth were placed. With regard to the results generally, the Committee only made a report that evening upon the third series. They hoped that they would have Professor Unwin's assistance in preparing the concrete arrangement of the whole three, and the Committee were much indebted to him for his remarks.

THE PRESIDENT observed that the usual way the strength of materials was judged (although he was sorry Professor Unwin did not quite agree with him) was to take the weight borne when the material showed the first sign of cracking. They then knew that it was loaded just beyond what it would bear, and from that could be inferred that one-fourth of that load was a sufficiently safe load. The result spoken of in the Report seemed to have been taken on the squeezing of the mortar.

International Competition for the Erection of an Orthodox Cathedral at Kronstadt.

Mr. V. Schröter (*Hon. Corr. M.*), of St. Petersburg, writes that no adequate designs have been sent in for the International Competition for an Orthodox Cathedral in Kronstadt, and that in consequence, a second competition will be held on the same conditions as before. The Cathedral, for the especial worship of sailors, and hence described in the conditions as a "Marine Cathedral," is to be built so as to hold a congregation of 4,000 people, and is to cost a maximum of 700,000 roubles. Four designs will be premiated; the first at 5,000 roubles, the second at 2,500 roubles, the third 1,500 roubles, and the fourth 1,000 roubles. These four premiated designs will become the absolute property of the Building Committee of the Russian Ministry of Marine.

A translation of the conditions will be found in the Library of the Institute.

THE EXAMINATIONS: REVISED SCHEME.

AN EXPOSTULATION.

The Report of the Board of Examiners "approved and adopted by the Council," as printed in the JOURNAL, p. 62, cannot be allowed to pass without comment.

As a report on so important a subject, it is singularly wanting in explanations or reasons for the changes proposed, and does not even set out the difference between the present system and that proposed, leaving such difference to be ascertained by the curious, by laborious comparison of the new with the present programme. This regrettable deficiency will, so far as the information given permits, be supplied in the following observations.

The only ground assigned for the proposal is the belief that "some simplification is desirable, particularly such a rearrangement of subjects as will prevent their overlapping, and a modification in the work required as 'Testimonies of Study'"; but not one word of reasons or explanation is vouchsafed to justify such belief.

The description of the Examinations and advice to applicants in the KALENDAR, pp. 235-240, clearly explain the aim and scope of the Progressive Examinations; and, unless the words of the Summary in this respect, are intended to have bearings and limitations, other than those ordinarily accepted, the paragraph expressing the opinion of the Board would appear to be superfluous.

The separation into Art and Science Sections—which, without any reason assigned, "it is thought undesirable to retain"—is a perfectly natural division of subjects, affords to students the opportunity of reducing the strain of sitting for the complete examination on one occasion, by taking one or other of these divisions separately, and thus being able to give to that in respect of which they may be the less informed some months of exclusive study (*vide* KALENDAR, footnote, p. 250).

The present programme was framed on the basis that the Intermediate should be taken not more than two years after the Preliminary, and the Final not later than three years after the Intermediate.

For the Intermediate a satisfactory knowledge of the Orders, of Classic Ornament, of English Architecture from the Conquest to A.D. 1500, and of the characteristic mouldings and ornaments of each period, and also of the subjects covered by Elementary Construction, is required.

For the ordinary student with the usual defective elementary education, the thorough acquisition of these subjects, to form the basis of further study, will fully occupy the time at his disposal; and the mastering of these subjects is of primary importance in teaching him how to learn to study and to cultivate those habits of accuracy and investigation essential to be acquired.

To these subjects it is actually proposed that "The Outlines of the History of Mediæval and Renaissance Architecture in Europe" should be added. If to be dealt with simply as "Outlines," but little advantage could be derived, while the wide range of the subject renders it most undesirable to be included within the curriculum of an examination intended to test preliminary training: nor, although "Outlines" may be used as a qualification, can it be properly classed as an "Elementary Architectural Study," and to its inclusion in the Intermediate there is the greatest possible objection.

The practice of "Sketching in Perspective of Details and Ornament" should be encouraged in every possible manner, and cannot be cultivated at too early a period, should be continued to the latest stage, and be fully developed in the "Final."

The proposal to give more weight to the Testimonies of Study is excellent, and, both by commendatory distinction and marking, will encourage the student to endeavour to maintain the high standard already attained in the Intermediate with so much advantage to the student.

In the Intermediate Testimonies of Study—in place of "one sheet of detail of mouldings and ornament" relating to the two sheets of mediæval architecture, and "one sheet of ornament, freehand drawing from the round in outline"—the details of mouldings and ornaments relating to the mediæval examples are to be included in the two sheets of such examples, and there is to be "one sheet of mediæval ornament freehand drawing from the round in outline."

For the two sheets of joiners' work, one sheet is substituted, thus reducing to nine sheets the eleven sheets of drawings now required, but not actually reducing the labour of preparing the Testimonies, since the details and ornament which would have been drawn on separate sheets will now be crowded on to the general drawing, if indeed they can be satisfactorily squeezed thereon.

It is in the Testimonies of Study for the Final that the most serious changes have been made.

For *four* sheets of studies, viz.:—

"A subject of classic architecture, shaded in sepia, Indian ink, or hatching, according to the rules of sciography";

"A subject of classic, mediæval, or renaissance architecture, in outline or shaded";

"Two studies of ornament from the round, shaded or hatched—one classic or renaissance, the other mediæval";

there is substituted—

"A study of ornament from the round, shaded."

For the two sheets of diagrams of constructive masonry, and two sheets of construction of roofs, floors, arches, retaining walls, &c., there are substituted—

"One sheet of diagrams of constructive masonry, and one sheet of diagrams of a roof-truss of iron or steel;"
while, alas! the optional work of "complete drawings from actual measurement of a groined vault of any period between A.D. 1100 and A.D. 1500" is omitted, a subject the thorough study of which, optional though it be, would be of the highest value in the education of an architect.

The subjects eliminated are all within the range of "advanced architectural studies," and should, in the ordinary course of his studies, be prepared by the student, without reference to the Examination at all, and if not so prepared his education is in so far defective or neglected. The elimination of those subjects from the programme is, therefore, to be greatly regretted as a retrograde step, which may be taken as a declaration that such studies are superfluous and unnecessary.

Although it is proposed by the report that in the Final Examination "the candidate's attention should be concentrated on those subjects which will claim his care in the practice of architecture," there is not any indication of the meaning to be attached to these words, and this apparently will not be disclosed until "the Revised Forms and Programmes may be had on application to the Secretary."

It is to be regretted that changes so closely affecting the principles of architectural education should have been in so bald a manner published to the members of the Institute, and the public at large, as settled and accomplished facts, determined on by the Council, and to come in force in June next, without one word of explanation of the reasons or necessity (should such exist) which may be supposed to justify the changes in a programme, the result of long consideration and discussion before the Progressive Examinations were established.

The Council may be within their rights in so proceeding, without taking the general body into their confidence; but it would certainly have been desirable that an expression of opinion on the proposed changes should have been elicited before they were announced as accomplished facts.

The instructive papers respecting the School of Architecture of Columbia University in New York, recently presented to the Library by Professor W. R. Ware, show a remarkable advance in the training of an architect, in striking contrast to the retrograde action approved by the Council, and when it is understood that in the United States there are certainly eight other universities—viz. Cornell, Illinois, Philadelphia, Cambridge, Boston, Providence, Syracuse, Bethlehem—in which similar perfect systems of architectural training are in operation, the regret at the course taken must be much intensified.

In the first years of the "Intermediate" there was a great desire expressed to cut down the requirements and make it "easy." These efforts were successfully resisted, with the happy result shown by the excellent work now produced for that examination, for which, had the then advocates of "simplification and prevention of overlapping" had their way, there would have been no inducement, and the present high standard would not have been attained; but the lesson of this experience has been disregarded, with the result now to be so much deprecated.

ARTHUR CATES.

*** With reference to the foregoing, the Board of Examiners have sent the following Memorandum:—

The sole object which the Board of Examiners had in view, in revising the scheme of Examinations, was to remove any features which they had reason to believe, from representations made to them, deterred Students from presenting themselves. Although, as Mr. Cates says, "The programme was framed on the basis that the Intermediate should be taken not more than two years after the Preliminary, and the Final not later than three years after the Intermediate," it has been found, practically, that a large number of candidates do not come up for the Final Examination till they have passed the stage of pupilage and have become paid assistants, in which position it was extremely difficult for them to find time for the large number of testimonies of study required for the Final, and for the reading necessary to answer satisfactorily the History papers of this Examination. Furthermore, the Final Examination is the one by passing which specially exempted candidates who are chief assistants or architects in practice have been enabled, since 1894, to qualify as candidates for the Institute Associateship, and it is a positive fact that the History papers in this examination formed a stumbling-block which in several cases was never surmounted. The Board therefore thought it undesirable to divert the senior candidates from their practical work of which the Final Examination is mainly the test. The Board felt that the necessity for some alteration was forced upon them, but they were most reluctant to interfere with the existing scheme, and it was only after long and numerous discussions that they advised the Council to adopt the revisions which they have proposed.

On behalf of the Board of Examiners,
(*Signed*) ALFRED WATERHOUSE,
Chairman.

THE HISTORIC DEVELOPMENT OF ARCHITECTURE.

Abstract of a course of lectures being delivered this Session before the Glasgow School of Art.

By W. J. Anderson [*A.*].

I. (lectures I.–VIII.).

In opening his course of lectures, Mr. Anderson attempted a consideration of the value of an historic aspect of architecture, pointing out what it might and might not teach. The lectures were only a small part of the traditional training of the school, a training which proceeded on the principle of putting a better tool into the hand of the younger man. If, after attending these lectures, students found that the casts of ornament and figure did not in their minds fall into their right place in their historic succession, and in the building for which they were designed, if they had no keener interest in the mediæval church and castle, and in their sketching and measuring of them, no greater facility in graceful and scholarly design, the lectures were not fulfilling the purposes for which they were planned. Referring to C. O. Müller's classification of the stages (1) imitative or artistic, (2) antiquarian, and (3) scientific, through which our attitude to ancient art had passed, the lecturer said that another was in view, in which we should learn by fuller and broader knowledge to be ourselves; not to devote overmuch attention to one page of architectural history, as revivalists had done; but to receive the larger tradition in a fuller consciousness of it, which could only come through an intelligent and sympathetic apprehension of all past achievement in relation to its surroundings. And this, under present circumstances, was by no means so difficult or huge a task as was commonly supposed. The student who could in some degree apprehend the historic significance of a type of design was for that very reason the less likely to misapply it or feebly copy it. At the same time students were reminded that this was only one side of their training, and counselled in their office work and the design competitions to develop the faculties of initiative. The remainder of this first lecture consisted of an outline of the long history of Egyptian architecture, illustrated by about a hundred photographs, plans, and restorations. The treatment was general and introductory, for Egyptian architecture covered a period of time greater than that to be dealt with in the succeeding twenty-four lectures, and in its permanence suggests analogies with the predominance of the Romano-Greek style in Europe down to the present day.

The second lecture, delivered on November 8th, was entitled "The Mycenian Age in Greece," in which period are discovered the true origins of European architecture. Comparing the palaces of Tiryns and Nineveh in their plan and construction, it was seen how the Achaian race, at least three hundred years before the great palace building era of Assyria, were in advance in their planning and their columnar and peristylar construction. From the discoveries of Schliemann and Dörpfeld it had been clearly demonstrated that to them and not to the Dorian conquerors was due the invention of the Doric entablature, and nearly every characteristic decoration. In the supersession of this primitive civilisation, the Dorians threw back for centuries every artistic development, leaving the expatriated Achaians to work out their destiny in a larger way in the New Ionia to which they were driven. The acropolis and domed tombs of Mycene, the sculpture of the period, and the primitive decorative forms which survive in later work, were all analysed and illustrated. Apart from its interest as the prototype of Hellenic architecture, the development is of value as an example of a logical style of wood construction of a highly architectural character, which was also copied in stone. The form of the Mycenian column, for example, is that of the legs of our furniture down to the present day, and was probably abandoned by the Greeks only when the wooden entablature was converted into a stone one, and a stronger form required. To the Mycenians also we owe the retreating faces of an architrave, composed originally of wood planks; the inclined sides of doorway openings, which remain throughout the Greek period and the Celtic civilisation of Europe; while the fluting of the columns, the patera, the rosette, the palmette, the spiral, are each of them forms upon which the later Hellene exercised his genius, leaving them ennobled and purified.

The third lecture dealt with the "Archaic" period of Greek art, which came about by the irruption of the Dorians in the Peloponnesus and Sicily, and the consequent migration of the Ionians to what was probably their original home. This is suggested in part by the type of citadel at Troy, or Hissarlik, in Asia Minor, which shows close affinity to the Mycenian examples. After a brief survey of the geography and history of Asia Minor in its relation to the arts, the lecturer proceeded to trace the growth of the archaic Greek style in that region, by whose traditions (those of Phrygia for example) the settlers were largely moulded. The temple form was believed to originate in the megaron of the dwelling, as at Troy, Tiryns, &c., and before 550 B.C. its structural development was complete, the talents of succeeding architects being directed to its refinement by modifications in detail and sculpture. The growth of the Ionic order from the archaic examples of Ephesus and Athens to its perfection in the Erechtheum was traced in successive stages. Turning to the Doric side, an attempt was made to sketch the growth of the Greek city, such as the Dorian colonists might plant in Sicily and

South Italy, and the matter illustrated by views of Agrigentum and the numerous Doric temples of Sicily. The development of the Doric order was traced from its appearance at Mycene past the archaic reliefs at Selinunto and the capitals of the Olympian Heræon to the perfection of the Athenian examples; and an account of the peculiarities in construction was given. Speaking of the archaic Doric temples generally, the lecturer said that though grave, ponderous, and profoundly impressive, they were quite without that opulence of fine drawing and modelling which characterised every Ionian work. In place of that there had been developed a perfect structural frame, a logical application of stone to the purpose of a temple shrine, a work of architectural art assuredly, but of the second rank. But the Ionian has yet to blend with it his more artistic perception, to clothe its cella wall with his particular invention the processional frieze, and to throw into the masses and grouping, the optical refinements, the applied sculptures, the polychromatic decoration, that instinct of sweetness of line and grace of proportion which is his birthright.

The subject of the fourth lecture was announced as the "Culmination and Coalescence of Hellenic Art in Attica." After a recapitulation of the main points of the previous lectures, the economic causes of the culminating period in Athens were touched upon. The interesting history of the worship or cult of Athene on the Acropolis, as it has been developed by Dörpfeld, was gone into at some length, that the real significance of the several monuments might be made apparent. From the Varvakeion statue, the chryselephantine image of Athene was restored, and Pausanias's description of it quoted, while the pediment sculptures were also shown in restored form and as they so far exist. The attention of the students was directed to the thoughtful disposition of the sculptured Panathenaic procession in its relation to the actual event it symbolised and commemorated. A detailed description of the Parthenon was then entered upon, illustrated by numerous slides, and several restorations of the interior were advanced. The results of the researches of Mr. Penrose and others were summarised and the colour decoration explained. The lecturer said that the Parthenon was to be regarded as the Dorian-Greek model transmuted and glorified by the highest artistic instinct, which appears most of all among Ionians, among the lineal descendants of the men of Mycene. The native Ionic order seems at this time to have fallen out of favour, but was naturally employed to house the very ancient image of Athene Nike, and was revived in the memorial or heroon of Erechtheus. In its relation to the other shrines of the Acropolis, the little temple of Athene Nike was considered, and its situation, and the significance of its sculpture indicated. To the succeeding lecture were relegated the Propylæa and the Erechtheum, other examples of skilful combination of Doric and Ionic elements from the same great centre, which was not more the mother of arts and eloquence than the child of wedded Ionian and Dorian art and philosophy.

Following up the subject of the former lecture, two of the most important of the public buildings of Athens, the Propylæa and the Erechtheum, were considered; both exhibiting the catholicity of taste characteristic of the Athenian artist and his adaptability under conditions prescribed, in spite of the conservatism and limitation of view which is supposed to distinguish him. In connection with the description of these works an attempt was made to realise the standpoint of the master confronted with a definite problem, setting altogether on one side questions of influence and environment, which, though none the less real, were doubtless beyond the view of the artist of the time. Applying this treatment to the Propylæa, the object of the building was considered; the nature of its site; the alignment which its designer decided on in its relation to the Acropolis wall and the great temple; and the original intention of the architect as it has been recovered by recent research. The various obstacles preventing the accomplishment of the scheme, in so far as they can be read in the building itself, were indicated; while the fitness of the architecture and the beauty of its details and painted decoration were shown by many illustrations. The Erechtheum was treated similarly, and explained in its relation to its purpose as a memorial of Erechtheus and his ancient megaron, the type of which it appeared to preserve in its main features; and in addition to views of its present state, restorations of interior and exterior, and of its relation to the other buildings of the Acropolis were shown by lantern slides. Extending the subject so as to embrace the culmination in Ionia, restorations of the Temple of Diana at Ephesus and the Mausoleum at Halicarnassos were advanced, with photographs of sculptures in the British Museum.

The lecture on "Declining Greece and Romano-Greek Revival" was chiefly concerned with the development of the Corinthian order: firstly, with the several buildings, such as the Choregic monuments, Tower of the Winds, and the Temple of Jupiter Olympius; and, secondly, with the growth of the capital and the order generally. The monuments were described in the light of recent researches by Dr. Jane Harrison, Mr. Penrose, and others; and many historical examples of the capital from the Temple of Apollo at Bassæ to that at Jupiter Olympius shown on a large scale. Various accessories of the temple and other architecture were then described, such as the tile and marble roof, the mosaic and plaster floors, and the metal work and decorative sculpture. But it was held that such sculpture could not be

described merely as accessory to the architecture. Mythologic in origin and motive, it was besides less vitally connected with the architectural development than in almost any other historic style. The Acropolis of Athens must have been a very forest of independent images, while other cities measured their comparative dignity by their thousands of statues. Architecture rather was accessory to sculpture, for the great chryselephantine idol might be regarded as the real motive of the erection of the whole temple and peribolus. After a word on the Dionysian theatre, and the palestra and gymnasia of the Greeks, the buildings of the Roman occupation were summarised: the Mausoleum of Philopappus; the Arch of Hadrian, and the Odeion of Herodes Atticus.

In the seventh lecture the architectural history of Italy was entered upon. From the tombs of Cervetri and Corneto some of the characteristics of primitive Italian architecture were gathered, and its close affinity with the Mycenian type demonstrated. The tufa wall of Roma Quadrata at the Palatine and the Cloaca Maxima and other indications of Etruscan type at Rome, were described and illustrated. As an example of the transitional period, the Temple of Fortuna was instanced, with its combined construction of tufa and travertine, and its combination of Etruscan or primitive Italian materials and arrangement with almost purely Hellenic proportions and detail. In the Augustan age the natural fusion of Greek decorative principles and Italian arched construction appears in such works as the Basilica Julia and Theatre of Marcellus; while the conservatism pertaining to religious structures maintains the modified Etruscan arrangement of the Temple of Fortuna, save where, as in the Julius Cæsar's Temple of Venus Genetrix, the Greek model is fully restored. The fora of Julius and Augustus were illustrated in their restored form with details of the Temple of Mars Ultor; also the Forum Romanum, with the Temples of Concord, Vesta, Castor and Pollux. The plan of the Pompeian Forum was adduced as a typical example of the Græco-Roman arrangement, and compared with the Agora of Assos as an indication of the close approach to identity of the customs of the two races. And just as the Greek agora became the Roman forum, so the Greek palestra became the Roman therma, and the Greek stadion branched into the Roman amphitheatre and circus. An account of the Roman dwellings and shops, with illustrations from Pompeii, concluded the lecture.

The last lecture of the term, delivered on December 20th, dealt with the culminating period of Trajan and Hadrian. The motive of the architecture of the Flavian emperors appeared to be that of currying public favour, and this is strikingly evinced in the supersession of Nero's colossal Golden Palace by the building of a huge place of public entertainment like the Colosseum. Brutal in purpose, and meretricious in decoration, there was yet a magnificence in its largeness of scale, and in the science displayed in its erection and arrangements, which, from an architectural point of view, made it well worthy of study. Sections were presented to show the variety of material employed and the engineering knowledge revealed in its construction, and it was indicated that probably the whole fabric outside and in was covered with coloured stucco and cement decoration, which would account partly for the rudeness and unfinished character of the travertine work. Along with this work, partly of the Flavian emperors, was considered the Palace of Domitian on the Palatine and the Forum of Nerva. Under Trajan, the Greek architect Apollodorus, and others, restored in his forum and basilica and other buildings the high character of the Augustan period, which was carried to a greater degree of splendour under Hadrian. The back to back cellæ of his temple of Amor and Roma, his villa at Tivoli, the Pantheon, and his mausoleum were described in their main features and illustrated by views and restorations. The recent discovery of the age of the Pantheon as that of his reign justified the classification of Hadrian's time as the culminating era of Roman art, and produced some of nature's own order out of the former chaos of Roman architectural history. The distinctive Roman material of this age is concrete, which made such conceptions as the Pantheon possible; and brick is only employed as a facing. Other materials were considered in their origin and employment, and various Roman constructural methods of centreing, building, and veneering were described. Before going on to the time of Septimius Severus, the lecturer connected the subject with Roman work in Britain, and particularly the Roman Wall in the North of England, to which the students had travelled in the autumn of the year.

REVIEWS. LXIV.

(176)

A TOPOGRAPHY OF ANCIENT ROME.

The Ruins and Excavations of Ancient Rome: a Companion Book for Students and Travellers. By Rodolfo Lanciani, D.C.L., Oxford, L.L.D., Professor of Ancient Topography in the University of Rome, &c. 8o. Lond. 1897. *Price* 16*s.* [*Messrs. Macmillan & Co., Ltd., Bedford Street, Covent Garden.*]

Possibly Professor Lanciani would be even more highly appreciated than he now is in this country if he wrote fewer books. With a subject so circumscribed he cannot avoid repeating himself. On the other hand, there is no harm to us in the matter, because on questions of so much intricacy as the Ruins and Excavations of Rome most of

us require to read and re-read. We do so the more willingly when assured, as in this instance, that the easy fluency of the writer is not inconsistent with scholarly accuracy and unrivalled knowledge of detail.

It is not his purpose, he says in the preface, and again on page 322, to provide a manual of Roman topography. But, notwithstanding these warnings, travellers who take this volume with them to Rome will find in it quite as much topography as they can well desire. They will discover that topography as Professor Lanciani here understands it is precisely what they most want. To architects his accounts of the Pantheon, the various controversies that have gathered round it, and the latest results of excavation and research will be highly welcome as an authoritative statement. To the intelligent traveller it will be doubly so. But the Pantheon, not being a ruin, only comes within his scope because of the excavations of late years. He does not promise and does not give critical remarks on the architecture. That is his principle throughout. He describes in detail the frescoes of the house of Germanicus on the Palatine, but has nothing to say of their style or their relation to Greek painting. Perhaps it is as well so, if we may judge from such passing occasions as when, on page 137, he praises highly a statue of Cybele. The photograph which he gives of the bust of that statue is sufficient to show that there is no reason for his regret that it was "allowed to migrate to foreign lands." It is a statue of colossal size, such as would be effective in some great hall, but otherwise of the ordinary Græco-Roman type. So, at least, it seemed to me previous to its migration. The specimens of architectural decoration from the Basilica Ulpia on pages 316–317, are good illustrations of the art in the time of Trojan, but to speak of their "marvellous beauty," page 318, is absurd. We quite agree with him, however, in his praise of the Head of a Greek Girl on p. 379.

But these matters are of no real consequence in a book the aim of which is to recall the growth and greatness of Rome as a city filled with historical associations. For such a task the first requisite is scholarly accuracy, such as we have been little accustomed to in English works on Rome. There Lanciani stands among the foremost. It is no charge against his accuracy if we point out that in this volume there are numerous small things which ought to have been seen to by some one. He knows very well that *Theseos* (page 142) is not a possible form of *Theseus*, and he cannot himself be blamed for the numerous misspellings of proper names from the English point of view. On page 114 the word "prototype" is used in an inverted sense. "Sentence of death on the Monuments" (page 249) is probably a translation from the Italian. The word "Monument" is frequently used in a foreign sense, as on page 378, where the Colosseum is called a "Monument." It is much to be regretted that a book otherwise so admirably suited to English wants should be disfigured by things of that sort.

British Museum. A. S. MURRAY.

(177)

CAMBRIDGE.

Cambridge described and illustrated, being a short History of the Town and University. By Thomas Dinham Atkinson, with an Introduction by John Willis Clark, M.A., F.S.A., Registrary of the University, late Fellow of Trinity College. 8o. *Lond. and Cantab.* 1897. *Price* 21*s. net.* [*Messrs. Macmillan & Co., Bedford Street, Covent Garden; Macmillan & Bowes, Cambridge.*]

Mr. Atkinson, after some years of careful research, has produced a work on Cambridge which certainly merits high praise. He modestly speaks of Cooper's *Annals* and his *Memorials of Cambridge*, and Messrs. Willis and Clark's *Architectural History of the University and Colleges of Cambridge*, as the chief fountains from which he has drawn his inspiration; but he has gone much beyond these, especially in the part referring to the town. It is really the first book which places the information about the history of the town in a compact and readable form.

He draws a lucid picture of the early condition of the town; part surrounding the protecting

FIG. 1.—SEAL OF 1423.

castle on one side of the river, and part around St. Benet's Church some half mile higher up on the opposite bank, all now enclosed in the much enlarged town.

The almost unique position as a reason for the growing up of an important town is well explained; he brings out clearly how the fens to the north were an impassable barrier, and the woodland to the south was almost the same, while the river was navigable up to the town but not above, where it was invariably forded, as shown by the names of the villages on it. Its bridge formed by far the most convenient route for the transit of goods between East Anglia and the West of England; and thus we find what might almost naturally be looked for, viz., the great Stourbridge fair, a fair of very early times, but which was flourishing as late as the last century, and is spoken of by Defoe (whom Mr. Atkinson quotes at some length) as

"not only the greatest in the whole nation, but I think in Europe." It certainly was of sufficient importance to make serious heart-burnings between the University and the Town as to their respective privileges in it. In 1589 charters were granted for assenting to certain "newe jurisdictions of the Universitie and therin betrayed the Towne, who shortlie after was putt of his Aldermanshipp and lived the remaynder of his life in great want and miserie and hatefull to all the townesmen."

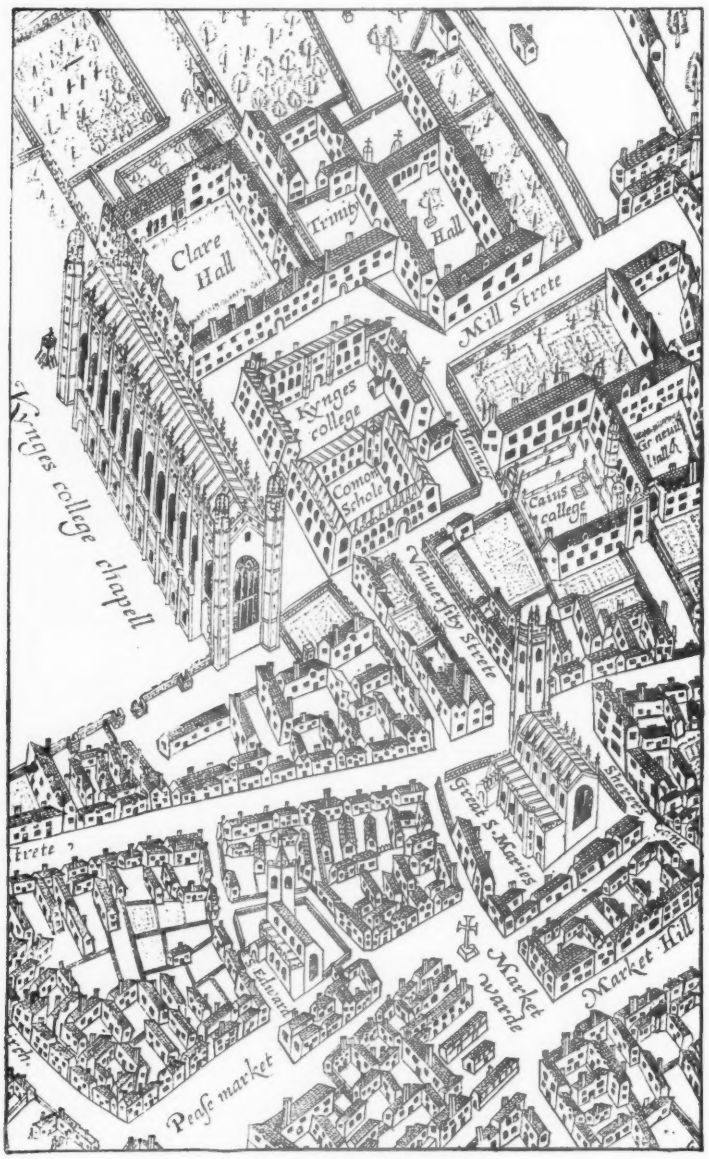


FIG. 2.—PART OF HAMOND'S MAP, 1592.

The description of the gilds makes an interesting part of one chapter. The gilds for trade purposes appear not to have gone beyond the gild merchants. Others were chiefly religious or social, but in nearly all cases they objected to allow the clergy to join them. In one case "the wives of brethren were admitted to the rights of membership, but all other women were excluded and also all parsons and bakers." They do not seem to have been wealthy bodies, for when a brother was in need he was allowed from 4*d*. to 7*d*. a week so long as there was money enough, and if more than one needed help this amount had to be divided among them. But though the gilds had but little for the spoiler, the "all devouring" Henry VIII. took what there was and suppressed them, and no societies for self-help and mutual assistance existed from that time until the more modern development of this century brought them out again on a much more extended scale.

The Town had a seal as early as 1349, but this was superseded in 1423 by the one illustrated [fig. 1, p. 141]. The arms at present in use were granted in 1575.

One most interesting chapter enters on the question of the topography, and brings out clearly the various changes that have taken place at different times: how King John made a

both to the University and Town, and the poor mayor, "one Gaunt," got himself into sad trouble

ditch, which, though now invisible, still runs in some parts but is drained off in others; how the

old Market Hill in olden days was much more built over than at present; how one good fire did a vast benefit in burning houses, and how the corporation were public-spirited enough to spend some £11,000 in preventing their being rebuilt. The old Market Hill, with these houses blocking it up, is clearly shown on Hamond's map, A.D. 1595 [fig. 2].

The topography leads on to the public buildings, and the history and changes in the Guildhall are particularly interesting. The old Shire House is now the front part of it, and the whole has been so changed in successive times that our author's zeal is shown in the way in which he has traced its history, partly from the buildings themselves and partly from documentary evidence. The Shire House, built by Essex in 1782, is in all probability soon to be swept away to make room for more commodious and more ambitious buildings.

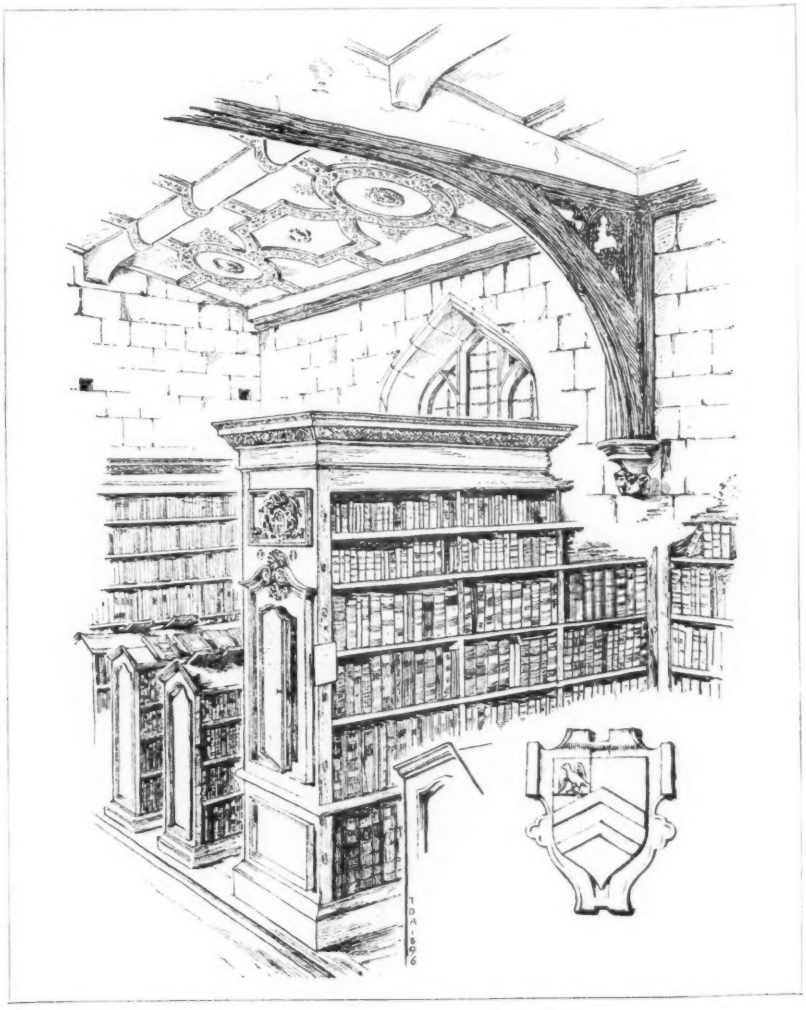


FIG. 3.—THE CATALOGUE ROOM, UNIVERSITY LIBRARY.

In the civil wars of Charles I. and Cromwell we find the part Cambridge took in the struggle. The way in which the election to the position of Freeman was managed for Cromwell was worthy of Tammany Hall. This simple act placed him in position to become member for the Town, and

thus to carry out the work he ultimately prosecuted with so much vigour.

Mr. Atkinson gives a list of the churches and a very clear and careful account of them and of their history. The peculiar arrangement, still to be traced in some which were partly college chapels and partly parish churches, is well set out, and plans in some cases are given, which are really necessary for a stranger to understand the account of what was done. These churches form a very important feature in the history of ecclesiastical buildings, and show how the religious bodies worked for the people, while at the same time they had to retain accommodation for their own religious rites.

Not content with the history of buildings, &c., he gives accounts of various societies, not only now existing, but of others which have ceased to exist. The Cambridge Camden Society is one of the most interesting, and it is curious that he has omitted to mention the great and historic trial about the stone altar at St. Sepulchre's which really brought it to an end.

Turning to the University, the lines of Messrs. Willis and Clark are followed much more closely. Theirs is such an exhaustive work that it would be difficult to find much matter that it has not dealt with. Here, however, it is put in a much more concise form, and the drier details which cannot be omitted from a complete history are touched with the gentle hand of the painter that throws a gleam of light on the haze to show the existence of what he cannot bring into greater prominence.

In this short review it would be difficult to follow Mr. Atkinson through the varied history of the University Schools and Library buildings, but he has kindly lent one of his sketches showing the catalogue room with its original roof (date *c.* 1400) and the ornamental plaster ceiling (date *c.* 1600). The book-cases (date *c.* 1700) are partly cut away in the sketch [fig. 3] to show the original roof corbel.

In Jesus College, where the west front of the old nunnery chapter house has been lately discovered, we find not only a full account of it but also explanatory drawings.

The work has several of the beautiful steel engravings which were done by Le Keux and Storer for Cooper's *Memorials*, and, as that work is now hard to obtain, it is perhaps fair to reproduce them, and not leave them hoarded up on the shelves of the owners of copies of the *Memorials*. In the description of each college a schedule of all the pictures in its possession has been included.

It will be seen that this work is really a most important addition to the topographic history of England. If antiquaries in other towns and in villages too would work out the histories as carefully and as faithfully as this has been done, what a wonderfully interesting series they would make!

Cambridge. WILLIAM M. FAWCETT.

(178)

ROYAL ACADEMY ARCHITECTURE.

The "Builder" Album of Royal Academy Architecture. Fo. Lond. 1897. *Price* 10*s.* 6*d.* [*The "Builder" Office, 46 Catherine Street, Strand.*]

This work comprises a selection of the illustrations which, during the past year, have appeared in the *Builder*, and made from those which were reproduced from drawings exhibited in the Royal Academy. The plates have the special advantage of being more carefully printed, and the double pages are without the fold which is necessary in the folio of the Journal. The single-page illustrations are printed on the same size sheet as those of the double pages, so as to keep each subject on a separate page, and they have the advantage of coming as a relief after the more crowded pages.

The description of the designs (which is specially set up for the purpose), with plan where given, is placed on the left-hand sheet opposite the drawing, the most convenient method to read the explanation of the design.

The prints are subdivided into subjects for easy reference in the same way that many collectors already adopt with the prints in the professional journals; thus churches and chapels come first, followed by public buildings, business premises, domestic architecture, drawings of old work, decorative designs, and sculpture.

There are 115 plates (indexed under subject and author's name), and the price at which the Album is issued ought to bring it within the reach of any architectural student. To the architectural historian of the future such a work ought to be of inestimable value, as it not only represents the architectural work of the age, but in some cases (viz. competition designs) the aspirations of those who have not for the moment been fortunate in the race. R. PHENÉ SPIERS.

Books received for Review.

Documents relating to the History of the Cathedral Church of Winchester in the Seventeenth Century. Edited by W. R. W. Stephens, B.D., F.S.A., Dean of Winchester, and F. T. Madge, M.A., Minor Canon and Librarian of Winchester Cathedral. 8o. Lond. & Winchester, 1897. [Messrs. Simpkin & Co., Ltd., Stationers' Hall Court, London; Messrs. Warren & Son, High Street, Winchester.]

The *Builder* Student Series Carpentry and Joinery. A Text-book for Architects, Engineers, Surveyors, and Craftsmen. Fully illustrated, and written by Banister F. Fletcher, A.R.I.B.A., and H. Phillips Fletcher, A.R.I.B.A. 8o. Lond. 1898. Price 5*s.* [Messrs. D. Fourdrinier, 46, Catherine Street, W.C.]

Progress of Art in English Church Architecture. By T. S. Robertson, with illustrations by the Author. 8o. Lond. 1897. Price 5*s.* [Messrs. Gay & Bird, 22, Bedford Street, Covent Garden.]

Stable Sanitation and Construction. By T. E. Coleman, F.S.I. With 183 illustrations. 8o. Lond. 1897. [Messrs E. & F. N. Spon, Ltd., 125, Strand.]